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ANALISIS FAKTOR YANG MEMPENGARUHI PENERIMAAN PENGGUNA PADA SISTEM PARKIR DIGITAL (STUDI KASUS: KABUPATEN SIDOARJO)

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ANALISIS FAKTOR YANG MEMPENGARUHI PENERIMAAN PENGUNA PADA SISTEM PARKIR DIGITAL (STUDI KASUS: KABUPATEN SIDOARJO)

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ABSTRAK

Kemajuan teknologi, kondisi ekonomi, dan pertumbuhan populasi mendorong pertambahan jumlah kendaraan di Indonesia dari tahun ke tahun. Pertambahan ini dapat berdampak pada permasalahan sosial dan lingkungan, namun dapat pula membawa peluang untuk pendapatan daerah dari sektor parkir. Untuk meningkatkan performa sektor parkir, Pemerintah Kabupaten Sidoarjo mengusung sistem parkir baru berbasis aplikasi pada smartphone yang mana diharapkan dapat meningkatkan kualitas parkir dan pendapatan daerah. Dalam implementasinya, keberhasilan dari sebuah sistem baru sangat bergantung pada respon pengguna terhadap sistem tersebut. Dalam tahap pengembangan dari sistem parkir baru, penelitian mengenai faktor yang mempengaruhi penerimaan pengguna harus dilakukan. Karenanya, modifikasi dilakukan terhadap Technology Acceptance Model (TAM) untuk menyesuaikan kebutuhan sistem parkir digital di Sidoarjo. Riset ini bertujuan untuk menjelaskan hubungan antara keinginan untuk menggunakan parkir digital, fitur keunggulan, persepsi kontrol perilaku, sikap inovatif individu, persepsi keamaan, serta komunikasi dan informasi dalam sebuah model. Metode Structural Equation Modelling (SEM) digunakan untuk pengolahan data dan analisis. Model yang dibuat akan dibagi menjadi model pengukuran dan model struktural. Hasil test pada model menunjukan bahwa semua faktor dan variable-variabel terukur di dalamnya telah memenuhi kriteria validitas secara konvergen dan diskriminan. Baik model pengukuran maupun model structural juga telah memenuhi seluruh kriteria dari tes Goodness of Fit. Dari 7 hipotesis yang dikembangkan untuk merepresentasikan hubungan antar faktor, terdapat 5 hipotesis yang diterima yakni; fitur keunggulan, sikap inovatif individu, dan persepsi keamaan mempengaruhi keinginan untuk menggunakan system parkir digital, serta sikap inovatif individu dan komunikasi dan informasi mempengaruhi persepsi kontrol perilaku. Berdasarkan analisis efek, fitur keunggulan adalah faktor yang memiliki pengaruh paling besar terhadap keinginan untuk menggunakan system parkir digital. Peringkat selanjutnya disusul oleh persepsi keamanan dan sikap inovatif individu. Komunikasi dan informasi hanya memberika dampak yang kecil terhadap keinginan untuk menggunakan system parkir digital. Sementara itu, persepsi kontrol perilaku memberikan sedikit efek negatif terhadap keinginan untuk menggunakan sistem parkir digital.

Kata kunci : Sistem parkir digital, penerimaan pengguna, structural equation modelling (SEM), intensi perilaku

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ANALYSIS ON FACTOR INFLUENCING USER ACCEPTANCE TO DIGITAL PARKING SYSTEM (CASE STUDY: SIDOARJO REGENCY)

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ABSTRACT

Technological advancement, economy condition, and population growth have driven number of vehicles in Indonesia to increase from year to year. Increasing number of vehicles may result in social and environmental problem, yet also yield opportunity as parking can be utilized as own-source revenue for regional government. To optimize parking performance, Dinas Perhubungan Sidoarjo proposes a new parking system based on mobile application that is expected to raise service level and own source revenue. Within the implementation, success of a new parking system heavily relies on how customer responds to the system. In research and development stage of the new parking system, a study related factor that analyze user acceptance need to be carried out. A modification model to the existing user acceptance models is developed. This research aims to explain relationship between factor behavioral intention to use, relative advantage, perceived behavioral control, personal innovativeness, security perception, and communication and information. Data processing and analysis is done using Structural Equation Modelling (SEM). Model is separated into measurement model and structural model. Result of measurement model testing shows that all measured variable and factor are convergent valid and discriminant valid. Both measurement model and structural model are also met all criteria in goodness of fit test. Out of 7 hypotheses developed to represent relationship between factors, 5 hypotheses are accepted; showing that relative advantage, personal innovativeness, and security have positive impact on behavioral intention, while personal innovativeness and communication and information have positive impact on perceived behavioral control. Effect analysis implies that relative advantage is the biggest on behavioral intention. The rank continues to perceived security and personal innovativeness. Communication and information also has small positive effect on behavioral intention. Meanwhile, perceived behavioral control has very small negative effect on behavioral.

Keywords : Digital parking system, user acceptance, structural equation modelling (SEM), behavioral intention.

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Jakarta, July 23rd, 2020

Author

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CHAPTER 1
INTRODUCTION

This chapter will explain about background of research, problem formulation, objective, benefit, limitation and assumption, and research outline.

1.1 Background

Population growth, economic growth, and technological advancement have brought a significant impact to development of automotive industry. With GDP forecasted to reach USD 1.3 trillion in 2020, large urban centers in Indonesia can drive balanced growth of vehicle and thus will create new opportunities. Rapid urbanization and the addition of 21 million new consumers will also drive overall consumption and demand for passenger vehicles and motorcycles. Automotive industry for passenger vehicle segment is expected to grow at 6.8% CAGR, while motorcycle segment is expected to grow at CAGR 4.8% in 2020 (Ipsos Business Consulting, 2016). Increasing number of vehicles can be an opportunity for party involved in transportation management. However, on the other side, it can also cause problems to the society. It may worsen traffic jam especially in urban city, add pollution to environment, and lose opportunity to utilize it as source of income, if transportation sector is not managed properly,

Need to establish system that maximizes owned source revenue (Pendapatan Asli Daerah) grows in Sidoarjo Regency Government and all other regional government, as UU no. 33 tahun 2004 gives autonomy for regional government to manage fund source by its own. Included in it is transportation management. Currently, in Sidoarjo Regency, number of 2 wheel vehicles increases by 60,000 vehicles per year and 4 wheel vehicle increases by 10,000 vehicles per year in average (Priambodo, 2018). This could be both opportunity and challenge for transport management sector. Good management of transportation could not only increase regional owned source revenue from transportation sector, but also could reduce amount of pollution and reduce stress experienced by people due to traffic jam.

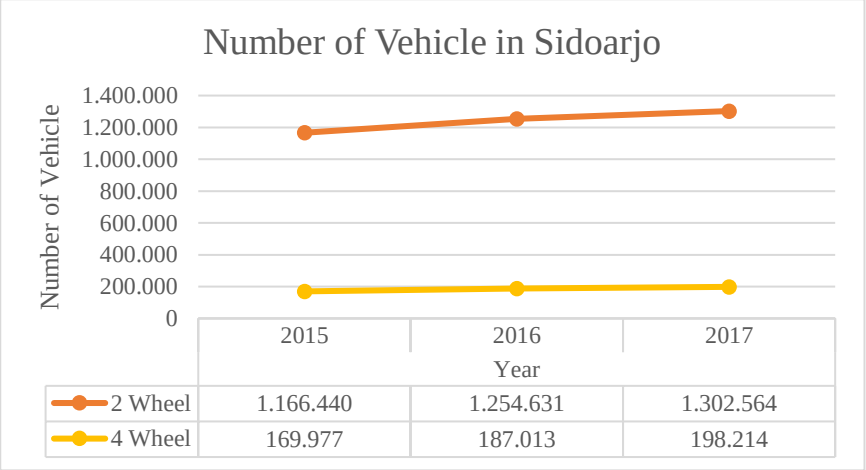

Figure 1.1 Number of Vehicle in Sidoarjo

Source: Priambodo (2018)

Parking is one element of transportation management. Public parking system consists of on street and off-street parking (Rye, 2011). On-street parking means vehicle is parked on the side of the street, while off-street parking means vehicles are parked away from the street (usually in parking building or parking field). On-street parking facility in Indonesia is owned by Regional Government, while off-street parking facility is owned by either regional government or private party. Total daily capacity of on-street parking in Sidoarjo Regency is 11,214 for motorcycle and 2,245 for car. Increasing number of vehicles positively affect parking demand, since 95% of the time, vehicle tends to be parked than used (Collins, cited in Rye 2011).

Currently, Sidoarjo Regency implements ticket based system as temporary replacement to subscription system (PT. Wukir Mahendra Sakti, 2018) for on-street parking. In ticket system, any vehicle parked in certain areas is charged per arrival to parking area, not based how long vehicle is parked. Parking fee differs according to type of vehicle parked. Meanwhile in subscription system, vehicle user does not have to pay any parking fee on the spot to parking attendant. Parking fee is paid in advance, at the same time when vehicle user pays for vehicle tax. Within the implementation, not all vehicle registered in Dinas Perhubungan Sidoarjo database pays the subscription fee as they also do not pay vehicle tax. Average ratio of

number of vehicles subscripted to parking service to number of vehicles registered in 2015-2017 is only 69.7%. This impacts in low actualization of parking revenue. Data from PT. Wukir Mahendra Sakti shows that in 2018, Sidoarjo Regency Government has potential income from parking revenue in amount of Rp. 102,146,595,652, -. In realization, only Rp. 28,176,793,500 or about 27% is recorded as Sidoarjo Regency Government's income from parking revenue.

Table 1.1 Comparison Between Number of Vehicle to Subscripted Vehicle

Category	Year			
	2015	2016	2017	2018
Number of Subscripted Vehicle 2 Wheels	814,236	859,589	865,347	851,635
Number of Subscripted Vehicle 4 Wheels	134,211	149,358	158,791	158,890
Total Number of Subscripted Vehicle	948,447	1,008,947	1,024,138	1,010,525
Total Number of Vehicle	1,336,417	1,441,644	1,500,778	-
Ratio	70.97%	69.99%	68.24%	-
Average				69.73%

Source: 'Sidoarjo dalam Angka' Report (2016-2019)

Parking attendants often charge vehicle although they already pay the subscription fee in advance, doubling up parking expense of vehicle users. This kind of illegal levy by parking attendants leads to decreasing trust and motivation of vehicle user to keep using the subscription system, thus contributes to the low realization of parking revenue potential. The retribution also does not count for parking frequency, so it is the same for people who rarely use vehicle and people who frequently use it. Ticket system seems fairer, but money collected by parking attendants is often not submitted entirely to Dinas Perhubungan Sidoarjo.

A new parking system based on digitalization is proposed to cope with drawback of both ticket system and subscription system. The system will cover more than just usage of mobile application as it covers other service improvements. Performance of parking attendants will be enhanced and there will be a clear standard for parking fee. Mobile application will be used to manage parking booking and payment. The application will be able to locate current position of user

vehicle, record parking data, and carry out cashless payment. Cashless payment will be useful to minimize chance of illegal levy. As a result, all payment can be directly collected by Dinas Perhubungan Sidoarjo instead of going to parking attendant's pocket and own source revenue from parking will increase. Access to well recorded parking data can also enhance transparency and be used to make further decision both by customer and government as service provider.

Dinas Perhubungan Sidoarjo, as the sole authority of on-street parking in Sidoarjo, has the capability to force people to eventually try out the digital parking system. However, when many problems occur within the implementation of parking system, it can give impact not only to user's trust and loyalty in long term usage of the digital parking system, but also for Sidoarjo Regency Government in general. Amount of resource used to make people shift voluntarily and to make people shift by force can also be different.

Success of new digital parking is greatly influenced by willingness of user to adapt with the system. Failure rate for newly developed information systems remains unacceptably high, especially for large and complex systems. Survey from Software Productivity Research in 1996 showed that 27% of projects were cancelled and 17% of projects experienced over cost. Meanwhile, according to Standish Group (1994), the top three reasons projects were late, over budget, or failed to deliver desired functionality are lack of user input, incomplete requirements, and changing requirements. Previous survey by PT. ITS Tekno Sains in 2019 shows that only around 60% of total respondent (parking user) are willing to shift from conventional parking system to digital parking system in Sidoarjo Regency. This number could be increased by having deeper comprehension about user requirement.

Research by Boehm and Papaccio in 1988 also revealed that it costs at least 50 times more to correct a requirements error by the time software already run and used by public user compared to when before the software is launched. Currently, mobile application of Sidoarjo's digital parking system is still in prototype version and new system is still in research and development stage.

Dinas Perhubungan Sidoarjo wishes to understand user perspective and their intention to use the new system, especially to cope with the potential losses. Based

on user respond, some improvements will be made into the current design of digital system. So, the new parking system will not only accommodate needs of Sidoarjo Regency Government to maximize own-source revenue, but also accommodate needs of user to receive money-worth parking service. Thus, number of people willing to use new parking system will be expected to increase. Therefore, studying factor influencing the behavior will be needed as basis to design a better digital system to facilitate users' need. Structural equation modelling is chosen as multivariate statistic method that will be used in this research, as it is able to analyze model that consists of latent variables, especially when mediating effect exists.

1.2 Problem Formulation

Problem incurred from the explanation of research background is about how to identify factor that influences user acceptance to new parking system in Sidoarjo Regency by implementing user acceptance model and conducting structural equation modelling to test the model.

1.3 Objective

Objectives that can be achieved by conducting this research are:

1. To identify factors / constructs that influence user acceptance for digital parking system and relationship among them.
2. To find rank of factor that has most influence on user behavioral intention in adopting digital parking system.

1.4 Benefit

Benefits that can be gained by conducting this research is to create improvement on initial design of digital parking system in Sidoarjo Regency based on research conclusion and recommendation.

1.5 Scope of Research

Scope of research that consists of assumption and limitation are as below.

1.5.1 Assumption

Assumption for this research are:

1. There is no cross loading between indicator under different construct.

1.5.2 Limitation

Limitation for this research are:

1. Digital parking system is only applied to on street parking in Sidoarjo Regency.
2. This study does not include actual usage construct as how other TAM models do because application has not been opened for public usage.
3. Due to online data collection, this research only includes people who has access to internet as respondent.

1.6 Research Outline

This research consists of 6 chapters starting from introduction, literature review, methodology, data collection and processing, analysis and interpretation, and also conclusion. Brief explanation about the 6 chapters are as below.

CHAPTER 1 INTRODUCTION

This chapter consists of background of research, problem formulation, research objective, scope of research, and research outline.

CHAPTER 2 LITERATURE REVIEW

This chapter explains about theoretical literature related to the observed system and method used in the research. Literature review consists of explanation of digital parking system in Sidoarjo Regency, technology acceptance model, and structural equation modelling.

CHAPTER 3 RESEARCH METHODOLOGY

This chapter consists steps that must be taken in order complete solving the formulated problem. In general, this research mainly consists of 3 stages, which are modelling stage, data collection and processing, and data analysis. In modelling stage, variable, indicator of each latent variable, and hypothesis are defined. The output from modelling stage is conceptual model. Data collection is done through

questionnaire distribution based on indicator that has been defined. Data processing is done to check if the indicator defined has represented the latent variable well and to check relationship between variables. Data analysis is done to each variable and indicator based on result of data processing. From data processing and analysis, conclusion and recommendation can be drawn.

CHAPTER 4 DATA COLLECTION AND PROCESSING

This chapter consists of data collection that starts with development of questionnaire question, questionnaire distribution, and measurement model testing, and structural model testing.

CHAPTER 5 ANALYSIS AND INTERPRETATION

This chapter consists of analysis of data that has been processed which includes analysis of respondent characteristic, measurement model, and structural model.

CHAPTER 6 CONCLUSION AND RECOMMENDATION

This chapter consists of final conclusion that answers each points of research objective and recommendation for Dinas Perhubungan Sidoarjo and for future development of digital parking research.

CHAPTER 2
LITERATURE REVIEW

This chapter will explain about literatures and theories related to creation and validation of model in analyzing factors that influence user acceptance in digital parking system. This chapter consists of digital parking system literature, user acceptance model literature, and structural equation modelling literature.

2.1 Digital Parking System

According to UU no.22 Tahun 2009 on Chapter 1 Section 1 line 15, parking is defined as a condition where a vehicle is stopped for a certain time and left by the driver on a parking facility. The concept of digital parking system is to implement technology that helps parking activity. Implementation of technology covers parking assistant system, car RFID tags, direction to near parking facility, information about vacant parking spot, smart payment, and others.

2.1.1 Category of Parking System

In real practice, there is no clear guideline about digital parking should be implemented; it differs in country depending on government needs and user needs. However, to understand the characteristic of a smart parking system, it can be started by identify it based on 5 major categories (Idris, et al., 2009).

1. Parking guidance and information system (PGIS)

   The focus of this system is to provide information which helps drivers in making decision to reach their destinations and to locate vacant parking space within a certain parking facility. Major elements of PGIS are information disseminating mechanism, information gathering mechanism, control center, and telecommunication network. Technology such as Global Positioning System (GPS) and Radio Frequency Identification (RFID) can be used to support PGIS. Japan proposed PIGS that is equipped with traffic flow information provided by Police Traffic Control (Sakai, et al., 1995).

2. Transit-based information system

   Transit based information system has many similarities with PGIS, but it focuses on giving user direction to park-and-ride facility. It is provided with

real time information about parking availability and public transportation status (schedule and traffic condition).

3. Smart payment system

   Smart payment is meant to cope with the drawback of cash payment system which may cause inconvenience to user and parking attendant. The system consists of contact method (smart card, debit card, credit card), contactless method (Automated Vehicle Identification using RFID), and mobile devices to carry out contactless method.

4. E-parking

   E-parking allows user to check availability of parking space in a certain area and make reservation to tag the parking space for a specified time.

5. Automated parking

   Automated parking involves computer-controlled mechanism where user can leave vehicle and let machine place the vehicle within an allocated space. It utilizes many sensors and computer systems to integrate the whole parking facility.

2.1.2 Current Design of Digital Parking System in Sidoarjo Regency

Dinas Perhubungan Sidoarjo has developed a digital parking system, that includes parking information system and smart payment system (PT. SPON Tech Indonesia, 2019). Figure below explains the new parking mechanism. Difference in previous parking system and digital parking system is denoted by different color of the activity-box. Pink box represents activities that are carried out in previous parking system. Also, in conventional parking systems, ticket issuance and payment are done between parking attendant and user, instead of system and user. Meanwhile, all, both pink and blue, activities box in the diagram are activities carried out in digital parking system.

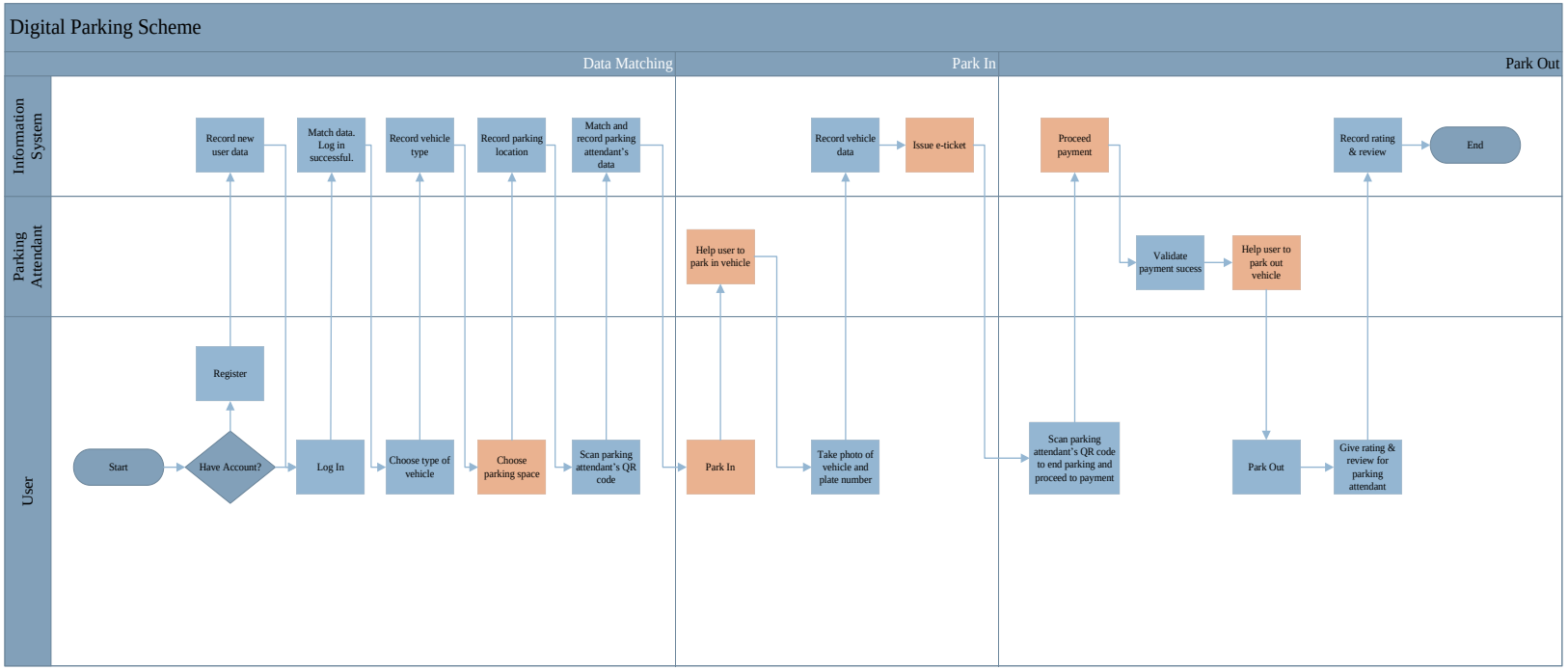

Figure 2.1 Proposed Digital Parking Mechanism

Source: PT. SPON Tech Indonesia (2019)

2.2 User Acceptance Model

This sub chapter will explain about theories used to construct conceptual model of user acceptance model for digital parking system. Theories related to user acceptance that is discussed in this chapter are variables and conceptual model from Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DOI), and Unified Theory of Acceptance and Use of Technology (UTAUT).

2.2.1 Theory of Reasoned Action (TRA)

TRA is a widely studied model from social psychology aspect which is concerned with the determinants of unconsciously intended behavior (Ajzen & Fishbein, 1975). There are several variables used in TRA model which are behavioral intention (BI), attitude of the person (A), and subjective norm (SN). BI is a measure of one's intention strength to perform a specified behavior. A is defined as individual's positive or negative feelings about performing the target behavior. SN refers to person's perception that most people who are important to him think that he should or shouldn't perform the behavior in question (Ajzen & Fishbein, 2010). According to TRA, performance of a person in a specified behavior is determined by his BI to perform the behavior, and BI is jointly determined by A and SN. The first conceptual model that represents relation between each variable is illustrated in figure below.

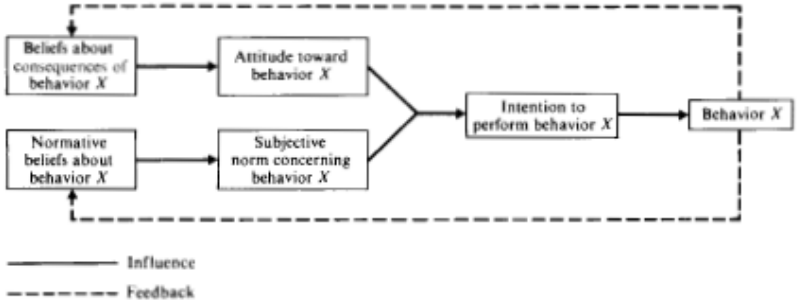

Figure 2.2 Basic TRA Model

Source : Ajzen & Fishbein (1975)

The model is then modified by adding some aspect from Theory of Planned Behavior (TPB), which are perceived behavioral control. It implies that in

performing a certain behavior not only beliefs and intention from internal side of a person that matters. There are limitations from ability or skill that must be possessed and environmental factor that takes the actual control.

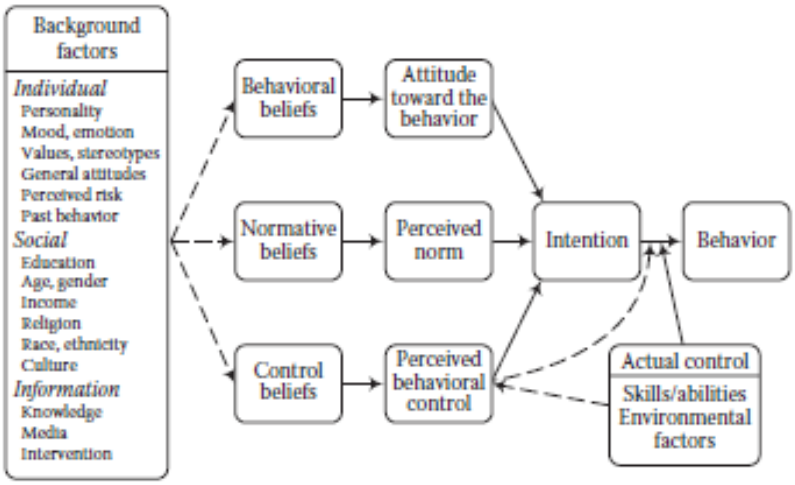

Figure 2.3 Modified reasoned action model

Source: Ajzen & Fishbein (2010)

Factor used in most socio-psychology studies are latent construct, which means factors such as norm and attitude cannot be measured directly (Borsboom, et al., 2003). Instead, deployment of indicators that represent each construct must be done. The same concept applies to other acceptance model or theory. In further stage of research, to validate the conceptual model, indicator of each variables must be defined and statistical analysis must be conducted.

2.2.2 Technology Acceptance Model (TAM)

The model was first introduced by David, et al, in 1989 as a predictor of factor influencing user to adopt a certain information technology and system. The goals of TAM are to provide an explanation of determinants of computer acceptance in general, and ability to explain user behavior across a broad range of end-user computing technologies and user population, while at the same time being both parsimonious and theoretically justified (Davis, et al., 1989).

This theory is derived from Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) by Fishbein & Ajzen in 1975 and 1980. Some

modification is made from TRA and TPB into TAM. Variables in TAM model are actual system use, behavioral intention to use (BI), attitude toward using (A), perceived usefulness (U), perceived ease of use (E), and undefined external variables. Relation between each variable are illustrated in figure below, in which incoming arrow from A to B means B is positively determined by A.

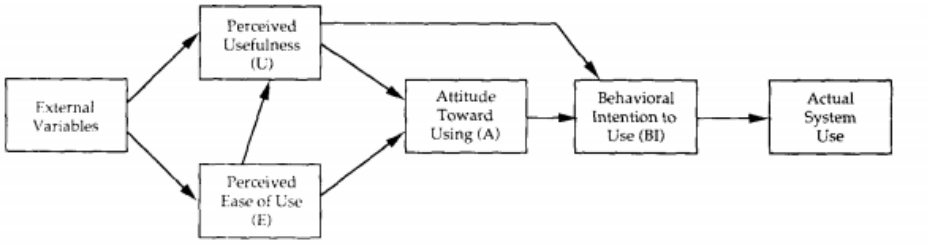

Figure 2.4 Technology Acceptance Model (TAM) Framework

Source: Davis, et al. (1989)

Definition for each variable is presented in table below.

Table 2.1 Variables in Technology Acceptance Model (TAM)

No.	Variable	Definition
1	Actual System Use	Actual usage by user to adopt a certain technology
2	Behavioral Intention to Use (BI)	A measure of one's intention strength to perform a specified behavior
3	Attitude toward Using (A)	Individual's positive or negative feelings about performing the target behavior
4	Perceived Usefulness (U)	Prospective user's subjective probability that using a specific application system will increase his or her job performance
5	Perceived Ease of Use (E)	Degree to which the prospective user expects the target system to free of effort

Source: Davis, et al. (1989)

2.2.3 Diffusion of Innovation Theory (DOI)

Diffusion of innovation is identified as the process by which an innovation is communicated through certain channels over time among the members of a social society. Study for this research first emerged from employee's adoption to new technologies brought by the company. Rogers argued that a person's decision toward innovation is not instantaneous, but rather a group of processes. The process is conceptualized through 5 stages (Rogers, 1983) :

1. Knowledge occurs when an individual (or other decision-making unit) is exposed to the innovation's existence and gains some understanding of how it functions.
2. Persuasion occurs when an individual (or other decision-making unit) forms a favorable or unfavorable attitude toward the innovation.
3. Decision occurs when an individual (or other decision-making unit) engages in activities that lead to a choice to adopt or reject the innovation.
4. Implementation occurs when an individual (or other decision-making unit) puts an innovation into use.
5. Confirmation occurs when an individual (or other decision-making unit) seeks reinforcement of an innovation-decision already made. However, he or she may reverse this previous decision if exposed to conflicting messages about the innovation.

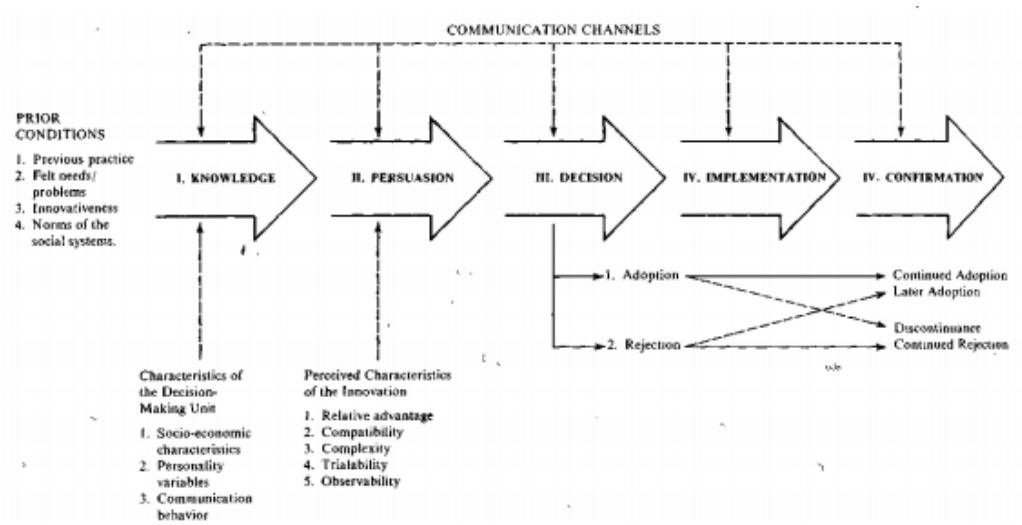

Figure 2.5 Innovation Decision Process Diffusion of Innovasion Theory

Source: (Rogers, 1983)

Other than being accepted or rejected, another factor that must be considered along with final decision to innovation adoption is rate of adoption. Rate of adoption is defined as speed at which innovation is adopted by members of a social system and measured as number of individual who adopts a new idea or system in a specified period such as year (Rogers, 1983).

Attributes or variables that mainly determine the rate of adoption are relative advantage, compatibility, complexity, trialability, and observability. Research shows that 49 to 87 percent of variance in adoption rate is explained by those 5 variables. Definition of each variable is presented in table below.

Table 2.2 Variables in Diffusion of Innovation (DOI) Theory

No.	Variable	Definition
1	Relative Advantage	Degree to which an innovation is perceived as being better than the idea it supersedes
2	Compatibility	Degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters
3	Complexity	Degree to which an innovation is perceived as relatively difficult to understand and use
4	Trialability	Degree to which an innovation may be experimented with on a limited basis
5	Observability	Degree to which the results of an innovation are visible to others

Source: Rogers (1983)

Other variables supporting rate of adoption are type of innovation-decision, nature of communication channels, nature of social system, and extent of promotion efforts. In type of innovation, the more people involved in the decision, the slower rate of adoption will be. Interpersonal communication channel may build awareness-knowledge, but the rate of adoption will be slower compared to when mass media channel is used. The communication channel has to be aligned with innovation context. Change agents is similar to communication channels, but it is

more focused on the individual that introduce a certain innovation to a society that is expected to have a desirable respond to the innovation.

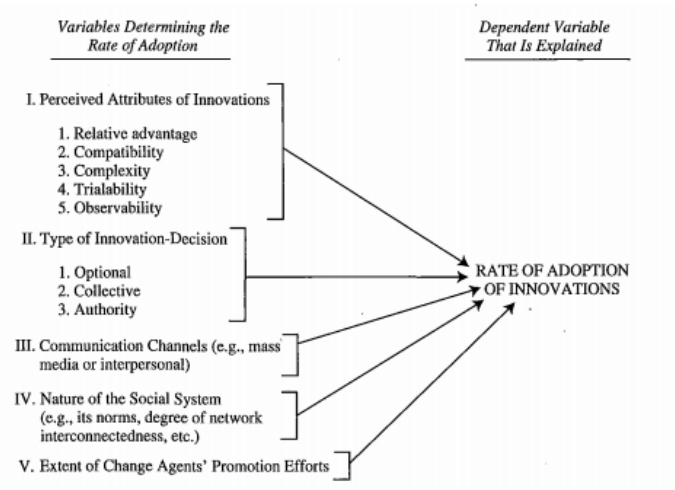

Figure 2.6 Variables Determining Rate of Adoption in DOI Theory

Source: (Rogers, 1983)

2.2.4 Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT is a model developed by Venkatesh, et al, as a modification to other acceptance model. This model identifies 4 antecedents variable that influences acceptance of information systems. It was developed through tailoring 14 initial constructs from 8 acceptance theories that has been established previously (TRA, TPB, TAM, Motivational Model, Combined TAM&TPB, Model of PC Utilization, DOI, and Social Cognitive Theory). The significant variables in UTAUT are effort expectancy, performance expectancy, social influence and facilitating conditions.

Table 2.3 Variables in Unified Theory of Acceptance and Use of Technology

No.	Variable	Definition
1	Performance Expectancy	Degree to which an individual believes that using the system will help him or her to attain gains in job performance
2	Effort Expectancy	Degree of ease associated with the use of the system

Table 2.3 Variables in Unified Theory of Acceptance and Use of Technology (con't)

No.	Variable	Definition
3	Social Influence	Degree to which an individual perceives that important others believe he or she should use the new system
4	Facilitating Condition	Degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system

Source: (Venkatesh, et al., 2003)

Furthermore, 4 significant moderating variables identified are gender, experience, age and voluntariness of use. (Venkatesh, et al., 2003). Those moderating variables have influence on performance expectancy, effort expectancy, social influence, and facilitating condition.

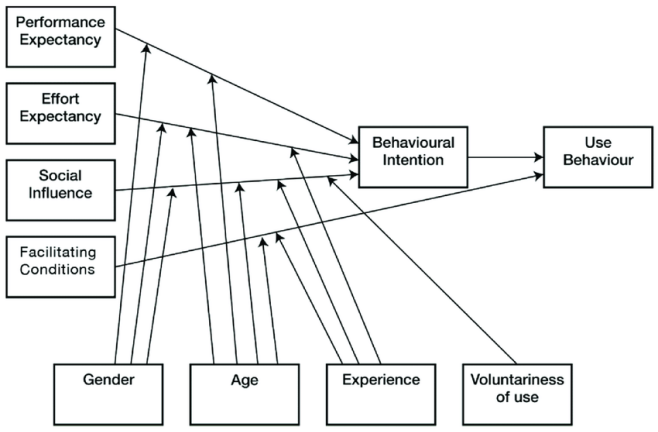

Figure 2.7 Unified Theory of Acceptance and Use of Technology Framework

Source: Venkatesh, et al. (2003)

2.3 Structural Equation Modelling

Structural equation modeling (SEM) is a family of statistical models that seek to explain the relationships among multiple variables. (Hair, et al., 2014). The method is basically develop based on multiple regression method, which analyze interrelationship structure expressed in a series of equation, combined with factor analysis method. SEM is also known as latent variable analysis and covariance

structure analysis as the method tries to explain relationship between latent construct within a defined structure. Main difference between SEM and other multivariate statistic method is that SEM estimates several interdependent multiple regression equations at the same time by specifying structural model used by the statistical program. Distinguish characteristic for SEM models are 1) estimation of multiple and interrelated dependence relationship, 2) ability to represent unobserved concepts in these relationships and account for measurement error in the estimation process, 3) defining a model to explain the entire set of relationships (Hair, et al., 2014).

2.3.1 Component of SEM Model

SEM model is representation of hypothesized relationship between latent construct and its indicator. There are two type of latent construct, exogenous construct, and endogenous construct. Exogenous construct is also known as independent variable as it is not explained by any other construct in the model and it does not have any arrow going into it. Meanwhile, endogenous construct is the dependent variable that has arrow going into it. Models in SEM are mostly visualized through path diagram.

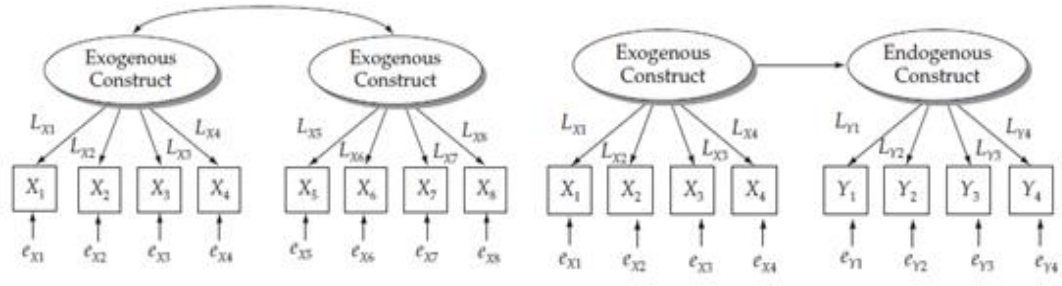

Figure 2.8 Path Diagram in SEM

Source: Hair, et al. (2014)

Below is the table of path diagram notation.

Table 2.4 Path Diagram Notation

No.	Name of Element	Symbol
1	Construct	Oval
2	Indicator	Square
3	Exogenous indicator	Square X
4	Endogenous indicator	Square Y
5	Dependence relationship	Straight arrow
6	Correlation relationship	Curve arrow
7	Loading factor	L
8	Indicator error	e

Source: Hair, et al. (2014)

2.3.2 SEM Measurement Model

Measurement model is SEM model that specifies the indicators for each construct and enables assessment of construct validity. The stage in measurement model starts with deployment of indicators, which includes determining number of indicator. Other things that must be determined are type of data to be analyzed, treatment for missing data, sample size, and estimation technique.

Data to be analyzed can be in form of correlational matrix or covariance matrix. Correlational matrix advantage are standardized default parameter estimates (between -1 to +1) as this gives ease to identification of inappropriate estimate. However, use of correlations as input can at times lead to errors in standard error computations (Cudeck, 1989). It is the reason why covariance becomes the most used data type.

Missing data should be addressed as important matter in research especially when missing data is in non-random pattern or amount of missing data reach 10% of total data items. There are 4 approaches to solve missing data. First is complete case approach, in which a respondent will be deleted there is he/she misses any data or variable. Second is all-available approach where all non-missing data is used. Third is imputation approach where missing data is replaced with substitute data.

Fourth is model-based approach, such as maximum likelihood and expectation maximization.

Sample size for SEM models may vary based on multivariate normality of the data, estimation technique, model complexity, the amount of missing data, and the average error variance among the reflective indicators. Minimum sample size based on model complexity and basic model characteristic are (Hair, et al., 2014):

- If model contains 5 or fewer constructs, each with more than three items (observed variables) and with high item communalities (0.6 or higher): 100 samples
- If model contains 7 constructs or less, modest communalities (0.5), and no under-identified constructs: 150 samples
- If model contains 7 or fewer constructs, lower communalities (below 0.45), and/or multiple under-identified (fewer than three) constructs: 300 samples
- If model contains large numbers of constructs, some with lower communalities, and/or having fewer than three measured items: 500 samples

Estimation method is mathematical algorithm used to identify estimate for free parameters. Several estimation methods used in SEM are ordinary least square (OLS), maximum likelihood estimation (EML), weighted least square (WLS), generalized least square (GLS), asymptotically distribution free (ADF). MLE and ADF is the most popular method nowadays. However, ADF requires large sample size.

To validate measurement model, a goodness of fit (GOF) test must be carried out. There are several type GOF measures, namely absolute fit indices, incremental fit indices, and parsimony fit indices. Example of GOF measures are χ^2 (chi square), Normed Fit Index (NFI), Tucker Lewis Index (TLI), Relative Non-Centrality Index (RNI), Standardized Root Mean Residual (SRMR), and Root Mean Square Error of Approximation (RMSEA).

2.3.3 SEM Structural Model

SEM structural model is a set of one or more dependence relationships linking the hypothesized model's constructs. The structural model is most useful in representing the interrelationships of variables between constructs. In the structural

model, hypothesis regarding relationship between each construct must be developed. To validate the hypothesis and overall structural model, goodness of fit test is used as assessment tool.

Overall process of GOF in structural model is similar to GOF in measurement model. However, in structural model, new SEM estimated covariance is calculated. The new covariance results in structural relationship. In measurement model, construct is assumed to be correlated with each other (correlational relationship). However, in correlational relationship, the correlations are assumed to be 0. It its why χ^2 GOF in measurement model will be less than χ^2 GOF in structural model. For GOF measures, there must be at least χ^2 value, 1 absolute index, and 1 incremental index. After that, overall fit of measurement and structural model should be compared. The closer structural model's GOF to measurement model, the better structural fit.

2.4 Research Position

Below is the comparison between this research and previous research in term of research object and variables used in the model.

Table 2.5 Research Position

No.	Research Title	Author	Year	Research Object	Variables
1	Analysis On Factor Influencing User Acceptance To Digital Parking System (Study Case: Sidoarjo Regency)	Saskia Putri Kamala	2020	Digital Parking System	- Behavioral intention - Relative advantage - Perceived Behavioral control - Personal innovativeness - Security - Communication
2	Analysis of Trust and Risk Variables in Affecting User Acceptance using Technology Acceptance Model Approach for Mobile Telecommunication Service Application Usage (Study Case: MyTelkomsel)	Edrian Hamidjaya	2019	Telecommunication Mobile Application	- Perceived usefulness - Perceived ease of use - Attitude toward using - Behavioral intention to use - Actual usage - Trust - Security

Table 2.5 Research Position (cont)

No.	Research Title	Author	Year	Research Object	Variables
3	Factors Influencing Adoption of Mobile Banking By Jordanian Bank Customers: Extending UTAUT2 With Trust	Ali Abdallah Alalwana, Yogesh K. Dwivedi, Nripendra P. Rana	2017	Banking Apps	- Performance expectancy - Effort expectancy - Social influence - Facilitating condition - Hedonic motivation - Price value - Behavioral Intention - Trust - Adoption
4	A Model of Factors Influencing Consumer's Intention to Use E-Payment System in Indonesia	Junadi, Sfenrianto	2015	E-Payment	- Intention - Effort expectancy - Performance expectancy - Social influence - Culture - Perceived security

Table 2.5 Research Position (cont)

No.	Research Title	Author	Year	Research Object	Variables
5	A theoretical acceptance model for computer-based communication media: Nine field studies	Pengzhu Zhang, Ting Li, Ruyi Ge, David C. Yen	2012	Communication Media	- Actual system Use - behavioral Intention - Attitude - Perceived usefulness - Perceived Ease of Use - Perceived communication efficiency & effectiveness - Information process support
6	Explaining Internet Banking Behavior: Theory of Reasoned Action, Theory of Planned Behavior, or Technology Acceptance Model	Shumaila Y. Yousafzai, Gordon R. Foxall, John G. Pallister	2010	Internet Banking	- Actual system use - Intention - Attitude - Social normative influences - Perceived behavioral control - Perceived usefulness - Perceived ease of use - Perceived security & privacy - Trust

Table 2.5 Research Position (cont)

No.	Research Title	Author	Year	Research Object	Variables
7	Exploring Factors Influencing the Adoption of Mobile Commerce Exploring Factors Influencing the Adoption of Mobile Commerce	Thariq Bhatti	2007	Mobile Commerce	- Intention - Effort expectancy - Performance expectancy - Social influence - Culture - Perceived security
8	Predicting Electronic Toll Collection Service Adoption: An Integration Of The Technology Acceptance Model And The Theory Of Planned Behavior	Chun-Der Chen, Yi-Wen Fan, Cheng-Kiang Farn	2007	E-Toll	- Intention - Attitude - Perceived usefulness - Perceived Ease of Use - Perceived behavioral control - Subjective norm

Table 2.5 Research Position (cont)

No.	Research Title	Author	Year	Research Object	Variables
9	The Role of Innovation Characteristics and Perceived Voluntariness in the Acceptance of Information Technologies	Ritu Agarwal, Jayesh Prasad	1998	World Wide Web	- Information - Relative advantage - Ease of Use - Compatibility - Personal Innovativeness - Intention
10	Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology	Fred D. Davis	1983	E-mail	- Perceived usefulness - Perceived Ease of Use

CHAPTER 3
RESEARCH METHODOLOGY

This chapter will give explanation about steps required to conduct the research, including development of digital parking acceptance model and model testing using structural equation modelling.

3.1 Research Flowchart

Overall process in conducting this research is illustrated through flowchart below. This research mainly consists of 5 stages, which are model development stage, data collection, measurement model testing, structural model testing, and analysis. After that, conclusions are drawn based on data processing result and analysis. The research flowchart is adopted from steps to conduct structural equation modelling by Hair (2014).

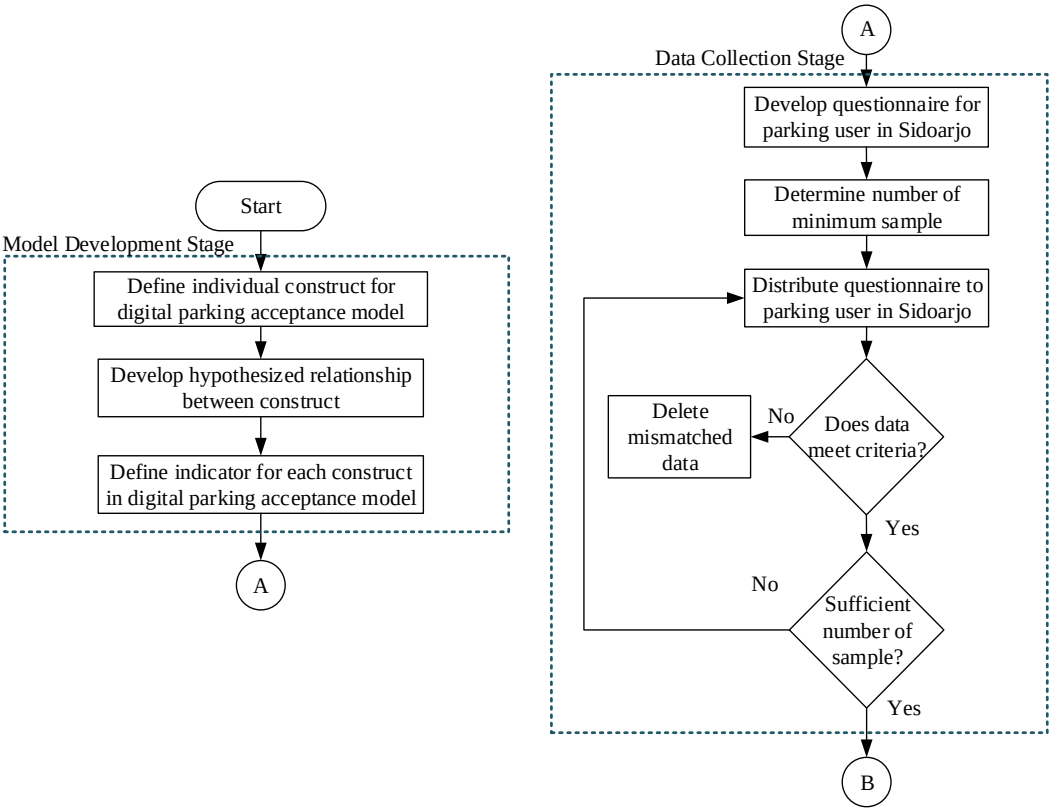

Figure 3.1 Research Flowchart

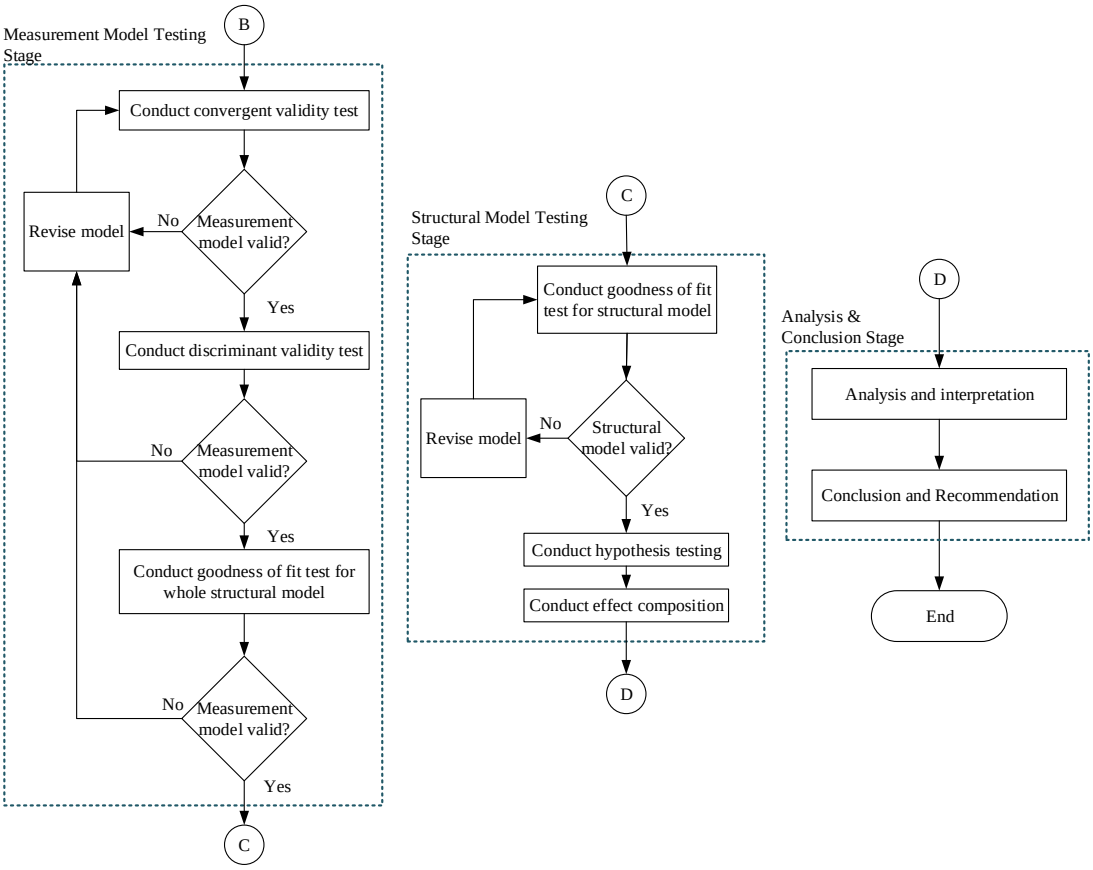

Figure 3.1 Research Flowchart (cont)

3.2 Model Development Stage

Model development includes identifying individual construct, defining hypothesized relationship between construct, and deploying indicator for each construct. Input of model development is existing literature related to technology acceptance model. Output of model development stage is conceptual model for digital parking system acceptance.

3.2.1 Identify Individual Construct

Process of identifying individual construct starts with understanding dimension of service quality as parking is included as services. There are 5 dimensions of service quality, usually known as SERVQUAL, which are tangible, reliability, responsiveness, assurance, and empathy (Zeithaml, et al., 1990). Difference in current parking system and digital parking is mapped in Figure 2.1

and identified based on these dimensions. The difference is then matched with dimension / construct that are mostly used in technology acceptance models.

Table 3.1 Individual Construct of Digital Parking Acceptance Model

Dimension of Service Quality	Specific Difference	Dimension of Acceptance Model
Tangible	Use of mobile cellphone (+ data package)	Personal innovativeness (willingness to learn), perceived behavioral control (ability to operate)
	Well-defined parking capacity and layout	Relative advantage
Reliability	Standardized parking price	Relative advantage
	Standardized performance of parking attendant (from review feature)	Relative advantage
	Personal data storage on online platform	Security
	Link to e-wallet provider	Security
Responsiveness	Real-time information about vacant parking slot information	Relative advantage
Assurance	Parking insurance	Security
	Identification code for official parking attendant	Security
Empathy	Media coverage to spread information about new system	Communication and Information
	Built-in 'Help' feature to provide basic FAQ	Communication and Information

The construct comes from other resources and theories related to acceptance model. Definition for each variable involved in the model are presented in table below.

Table 3.2 Construct Definition for Digital Parking System

Construct	Definition	Source
Behavioral intention	A measure of one's intention strength to perform a specified behavior	Davis, et al. (1989)
Relative advantage	Degree to which an innovation is perceived as being better than the idea it supersedes	Rogers (1983)
Personal innovativeness	Willingness of an individual to try out any new information technology	Agarwal & Prasad (1998)
Perceived behavioral control	Access to resources and opportunities needed to perform a behavior	Kang, et al. (2006)
Security	Perceptions of the degree of protection against the threats	Yousafzai, et al. (2010)
Communication and Information	Extent to which a person believes that using a certain medium will help him/her communicate information clearly or understand information accurately, and perceived communication efficiency	Zhang, et al. (2012)

'Trust' has been one of the most influential variable on behavioral intention in previous research (Hamidjaya, 2019) (Yousafzai, et al., 2010) . However, the definition of it has been covered by perceived security factor.

3.2.2 Develop Hypothesis

The hypothesis represents relationship between two constructs. All relationship between construct are assumed to be positive, according to previous

research that have been conducted. Detail for each hypothesis is represented in table below.

Table 3.3 Proposed Hypothesis for Digital Parking System

Code	Hypothesis	Source
H1	Relative advantage positively influences behavioral intention	Rogers (1983)
H2	Perceived behavioral control positively influence behavioral intention	Ajzen & Fishbein (2010)
H3	Personal innovativeness positively influences perceived behavioral control	Jackson, et al. (2013)
H4	Personal innovativeness positively influences behavioral intention	Thakur & Srivastava (2014)
H5	Security positively influence behavioral intention	Lallmahamood (2007)
H6	Communication and information positively influence behavioral intention	Zhang, et al. (2012)
H7	Communication and information positively influence perceived behavioral control	Maichum, et al. (2016)

Conceptual model for this research is represented in path diagram below.

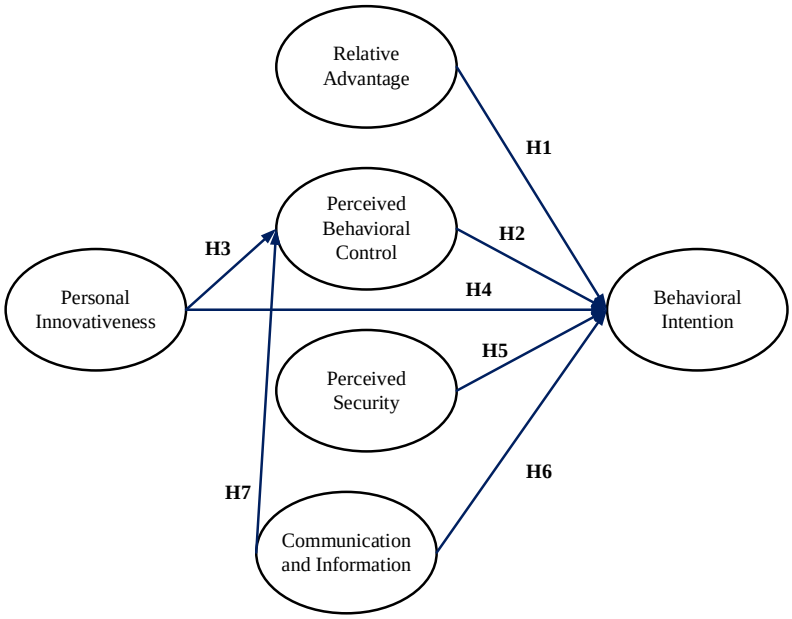

Figure 3.2 Conceptual Model for Digital Parking System Acceptance

From the conceptual model, exogenous factors for this research are relative advantage, personal innovativeness, perceived security, and communication and information. Meanwhile, endogenous factors are behavioral intention and perceived behavioral control. At the same time, perceived behavioral control also become mediating factors.

3.2.3 Defining Indicators

Indicators are measurable observed value that represents latent variable / construct in structural equation modelling. A construct must have minimum 3 indicators to represent it (Costello & Osborne, 2005). Each construct is deployed into indicators in reference to other established research.

Table 3.4 Indicator for Digital Parking System

Construct	CODE	Indicator	Source
Behavioral Intention	BI 1	Anticipation to use (first time)	Jackson, et al (2013)
	BI 2	Plan to use (first time)	

Table 3.4 Indicator for Digital Parking System (cont)

Construct	CODE	Indicator	Source
Behavioral Intention	BI 3	Plan to frequent use	Taylor & Todd (1995)
	BI 4	Plan to constant use	
	BI 5	Tendency to recommend to others	
Relative Advantage	RA 1	Convenience to use	Choudhury & Karahanna (2008)
	RA 2	Provide better price	
	RA 3	Conduct task more quickly	Al-Gahtani & King (1999)
	RA 4	Good substitute	Riquielme & Rios (2010)
Perceived Behavioral Control	PBC 1	Ownership of mobile phone	Jackson, et al (2013)
	PBC 2	Availability of time to install mobile application	Chen, et al (2007)
	PBC 3	Knowledge to operate mobile application	
	PBC 4	Ability to operate mobile application	Jackson, et al (2013)
	PBC 5	Ability to afford fee related to mobile application usage	Chen, et al, (2007)
	PBC 6	Stability of internet network to support use of mobile application	
Personal innovativeness	PI 1	Tendency to experiment new technology	Lu (2014)
	PI 2	First one to try out new technology	Jackson, et al (2013)
	PI 3	Having experience with various type of technology	

Table 3.4 Indicator for Digital Parking System (cont)

Construct	CODE	Indicator	Source
Personal innovativeness	PI 4	No hesitation to use new technology	
	PI 5	Willingness to put effort in experimenting with new technology	
Security perception	PS 1	Safe data storage	Pavlou (2001)
	PS 2	Existence of mechanism to address potential violation	Yousafzai, et al (2010)
	PS 3	Right to verify or correct information before finalize action	
	PS 4	Credibility of e-wallet provider	
	PS 5	Credibility of system owner	Pavlou (2001)
Communication & Information	CI 1	Presence of offline information media (direct demonstration, presentation, or newsletter)	Amoako-Gyampah & Salam (2004)
	CI 2	Presence of online information media	Park, et al (2012)
	CI 3	Sufficient amount of information	
	CI 4	Newness of information	
	CI 5	Level of easiness to understand information given	

3.3 Data Collection Stage

Online questionnaire will be developed based on modification of each indicator defined in the modeling stage. The indicator is adjusted to be applied in

digital parking system. The questionnaire uses 1 to 6 scale as 6 points of the Likert scale have more level of discrimination and higher reliability compared to 5 points of the Likert scale according to Chomeya (2010) as cited from Hamidjaya (2019). After that, questionnaire will be distributed to Sidoarjo citizen.

Table 3.5 Likert Scale for Questionnaire Development

Scale	Response
1	Very strongly disagree
2	Strongly disagree
3	Disagree
4	Agree
5	Strongly agree
6	Very strongly agree

Source: Chomeya (2010)

Minimum number of samples is determined through number of constructs exist in the model and indicator communalities. Model with 6 constructs, more than 3 indicators for each construct, and indicator communalities higher than 0.6, minimum sample required is 150 (Hair, et al., 2014). Minimum number of sample can also be determined using 5:1 ratio for each indicator (Bentler & Chou, 1987), thus results in 150 samples for this research.

Incomplete information in the questionnaire result will create missing data. If number of missing data is still below 10% of total data, data with incomplete information will be deleted. If number of missing data causes number of data to be below minimum sample size, then data gathering must be conducted for the second time until it reaches minimum number of sample size.

3.4 Measurement Model Testing

Measurement model testing is conducted to check if all indicators represents a construct well. It consists of 2 test type. The first one is goodness of fit test. It is conducted to see how well the specified model reproduces the observed covariance matrix among the indicator items. Null hypothesis used is whether data fits the

overall model. Parameter commonly used in GOF test are Chi Square (χ^2), Root Square Mean Error of Approximation (RSMEA), Standardized Root Mean Residual (SRMR), Normed Fit Index (NFI), and Parsimony Normed Fit Index (PNFI). Each parameter has a cut off value where an indicator is said to fit the construct.

Table 3.6 Cut Off Value for Goodness of Fit Measures

Category	Parameter	Cut Off Value	Source
Chi Square	χ^2/df	≤3	Klein, et al. (1994)
Absolute Fit	RMSEA	≤0.1	MacCallum, et al. (1996)
	SRMR	≤0.08	Hu & Bentler (1999)
Incremental Fit	NFI	≥0.9	Bentler & Bonett (1980)
	NNFI	≥0.95	Hu & Bentler (1999)
Parsimony Fit	CFI	≥0.95	Hu & Bentler (1999)
	PNFI	≥0.5	Mulaik, et al. (1989)

The second one is construct validity test. Construct validity is extent to which a set of measured variables actually represents the theoretical latent construct those variables are designed to measure. There are 3 of validity, which are convergent validity (extent to which indicators of a specific construct converges or shares a high proportion of variance in common) and discriminant validity (extent to which a construct is truly distinct from other constructs). Meanwhile, for convergent and discriminant analysis, a model is said to be fit when it meets required cut off value.

Table 3.7 Cut Off Value for Construct Validity

Parameter	Cut Off Value	Source
Convergent Validity		
Standardized loading	> 0.5	Hair, et al, 2014
AVE	> 0.5	
Construct reliability	> 0.7	

Table 3.7 Cut Off Value for Construct Validity (con't)

Parameter	Cut Off Value	Source
Discriminant Validity		
AVE	> (Correlation)^2	Hair, et al, 2014

3.5 Structural Model Testing

Structural model testing is done to check if hypothesized relationships between constructs are significant and model has properly fit data. Observed data will be transformed to covariance matrix, but the matrix will be different. In measurement model construct are assumed to correlated to one another, while in structural model only hypothesized relationships that have value and other correlation is assumed to be 0.

Overall model fit will be assessed using goodness of fit, similar to in measurement model. The cut off value that is used is also the same in Table 3.4. After model fit is achieved, hypothesis testing is conducted. T-value is used as parameter to accept or reject the hypothesis based on confidence level. After that, path analysis and effect composition-decomposition are conducted. Path is determined by direct and indirect "route" that can explain a certain hypothesis. After that, factor loading for each hypothesis is calculated. In effect composition, total effect of each path is calculated by multiplying factor loading for indirect effect and adding loading factor for direct effect. Meanwhile, effect decomposition tries to find exogenous construct with highest average value as the most influential construct to the behavioral intention.

3.6 Analysis and Conclusion

After data processing, data will be interpreted and analyzed to then made into conclusion.

3.6.1 Analysis and Interpretation

In this stage, data that has been processed based on SEM method is interpreted. Analysis will be done to respondent characteristic, measurement model,

and structural model. Analysis on each hypothesis, especially if there is any rejected one, will also be conducted based on variation of respond in each indicator. After all, model overall fit is analyzed.

3.6.2 Conclusion and Recommendation

In the final stage, conclusion is drawn in respect to research objective, which are the brief explanation about model construction and final accepted hypothesis. Recommendation for future research and development of digital parking system will also be made, especially in coping with limitation incurred in this research.

CHAPTER 4
DATA COLLECTION AND PROCESSING

This chapter will give explanation about how data is collected and how measurement model and structural model is processed using statistical tools.

4.1 Data Collection

Online data collection is done to capture how user perceive the new parking system that will be established by Dinas Perhubungan Sidoarjo. In total there are 188 data gathered from Google form. Questionnaire is distributed in Bahasa Indonesia to give easiness for respondent to understand the meaning of each question and statement. Respondents of this questionnaire are Sidoarjo Regency residents who actively transports using private transportation means (motorcycle, car, pickup-truck, etc) and have experience in using on-street parking. Respondent characteristics that are captured in this questionnaire are age, type of vehicle that is mostly used, and recognition to the proposal of digital parking system in Sidoarjo Regency. However, due to duplication and incomplete answer, 9 data are deleted and remaining 179 are proceeded. Result of respondent characteristics are summarized in figures below.

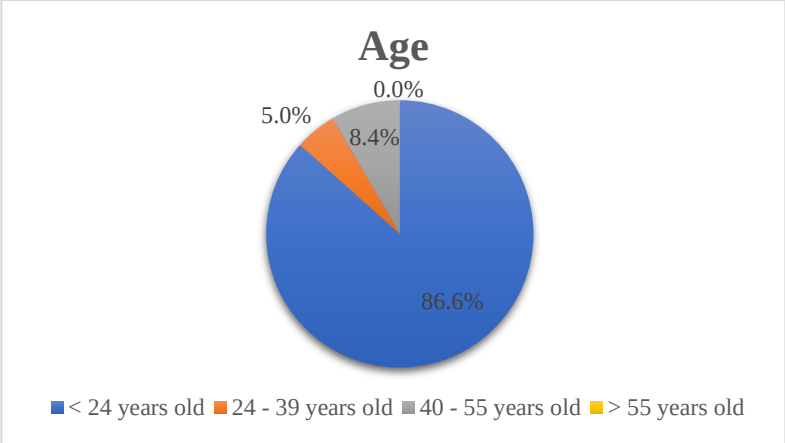

Figure 4.1 Respondent's Age

In the figure, it is shown that age category is divided into below 24 years old, 24 – 39 years old, 40 – 55 years old, and over 50 years old. The classification is made based on age generation (Generation Z, Millennials, Generation X, and

Baby Boomers), according to Pew Research Center (2019). From the recapitulation, 86.6% percent of respondent comes from age of below 24 years old, 5% comes from age of between 24 to 39 years old, and 8.4% comes from age of between 40 to 55 years old.

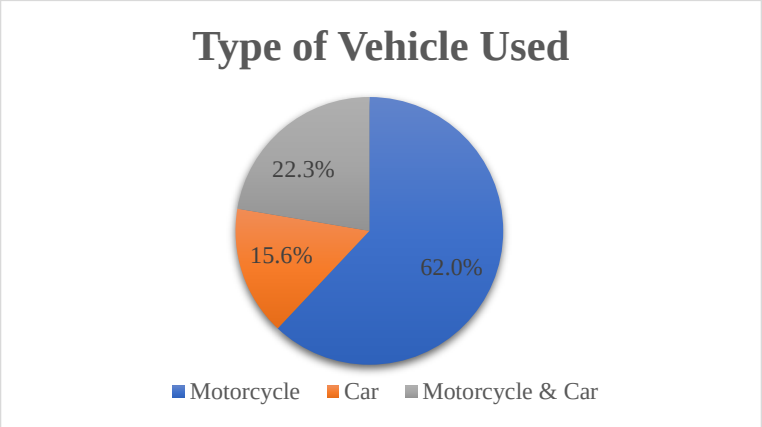

Figure 4.2 Respont's Type of Vehicle

Meanwhile for type of vehicle, the initial answer is that 61.7% of respondents transports by motorcycle, 15.6% of respondents transports by car, 22.2% of respondents transports by both car and motorcycle, and 0.6% of respondent transports by walking. The respondent who answer walking as their mean of transportation is deleted from the dataset as he does not meet criteria of respondent. The percentage changes slightly into 62%, 15.6%, and 22.3% for motorcycle, car, and both car and motorcycle respectively.

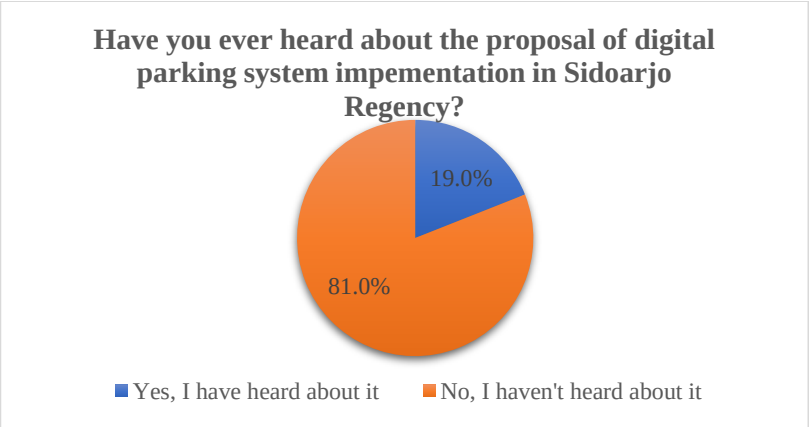

Figure 4.3 Respondent's Knowledge on Proposal of Digital Parking System Sidoarjo

Last question that represents respondent characteristic is recognition to newly proposed digital parking system in Sidoarjo Regency. Surprisingly, only 19% of respondents stated that they already know or hear about the proposal of digital parking system in Sidoarjo Regency before they are involved in this research. Meanwhile, 81% states that they never know or hear about the proposal of new parking system before.

Data that will be used to test measurement and structural model consist of 30 questions from 6 factor / latent variables. The question is adapted from indicator that has been defined in chapter 3 and modified to fit the case of digital parking system in Sidoarjo Regency. Below is the recapitulation of answer for each measured variable / indicator in percentage.

Below are the recapitulation and graphical representation of data collection for perceived behavioral control factor and its measured variables.

Table 4.1 Indicators of Perceived Behavioral Control

CODE	Indicator
PBC 1	Ownership of mobile phone
PBC 2	Ability and availability of time to install mobile application
PBC 3	Knowledge to operate mobile application
PBC 4	Ability to operate mobile application
PBC 5	Ability to afford fee related to mobile application usage
PBC 6	Stability of internet network to support use of mobile application

Table 4.2 Questionnaire Recapitulation for PBC's Measured Variables

Percentage of Answer									
Variable	1	2	3	4	5	6	Mode	Median	Mean
PBC1	0.0%	0.0%	1.1%	10.6%	24.6%	63.7%	6	6	5.5
PBC2	0.6%	0.6%	5.6%	8.9%	26.3%	58.1%	6	6	5.3
PBC3	0.6%	0.6%	3.9%	12.3%	26.8%	55.9%	6	6	5.3
PBC4	0.0%	0.0%	1.7%	12.8%	29.6%	55.9%	6	6	5.4

Table 4.2 Questionnaire Recapitulation for PBC's Measured Variables (con't)

Percentage of Answer									
Variable	1	2	3	4	5	6	Mode	Median	Mean
PBC5	1.7%	1.7%	3.4%	10.1%	31.3%	52.0%	6	6	5.2
PBC6	0.0%	3.9%	4.5%	30.7%	29.1%	31.8%	6	5	4.8

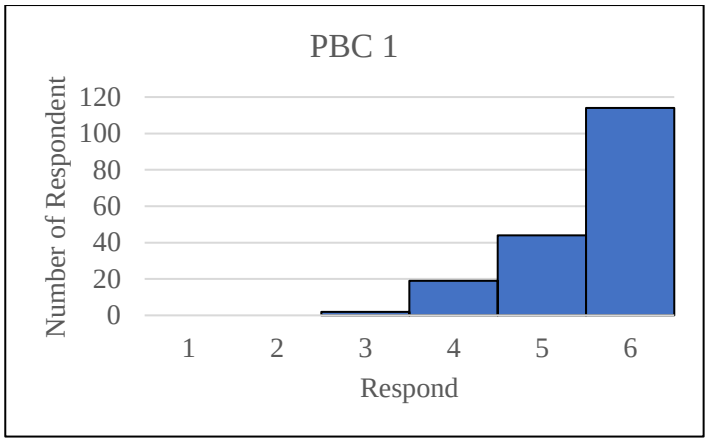

Figure 4.4 Result of PBC1 Questionnaire

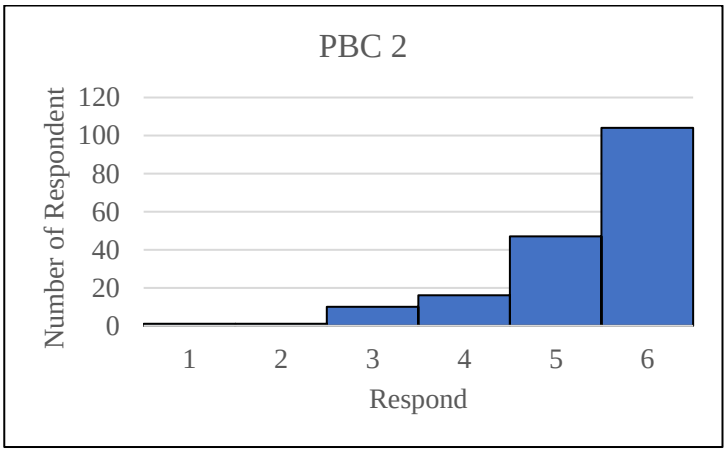

Figure 4.5 Result of PBC2 Questionnaire

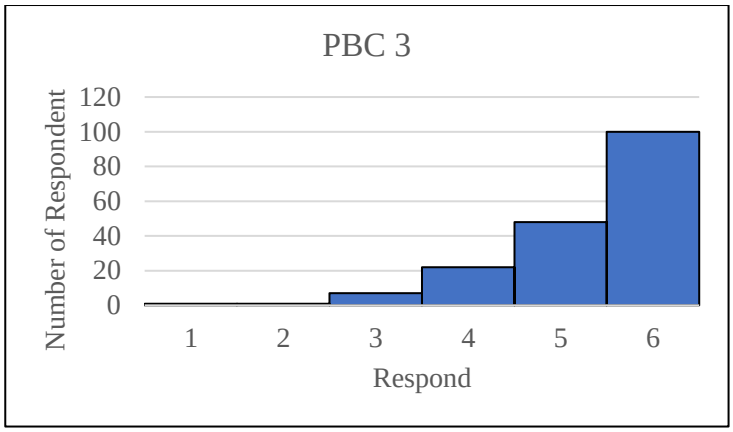

Figure 4.6 Result of PBC3 Questionnaire

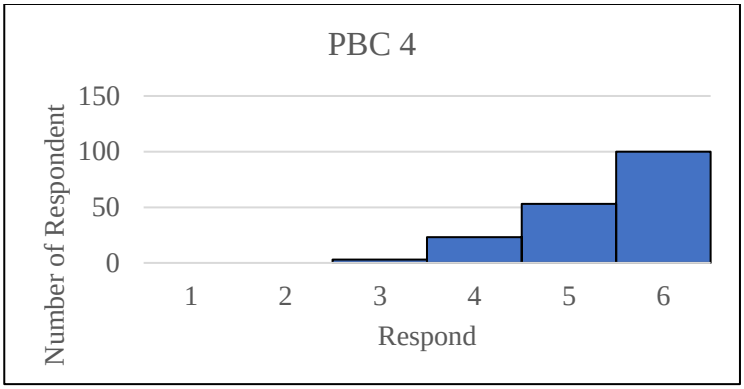

Figure 4.7 Result of PBC4 Questionnaire

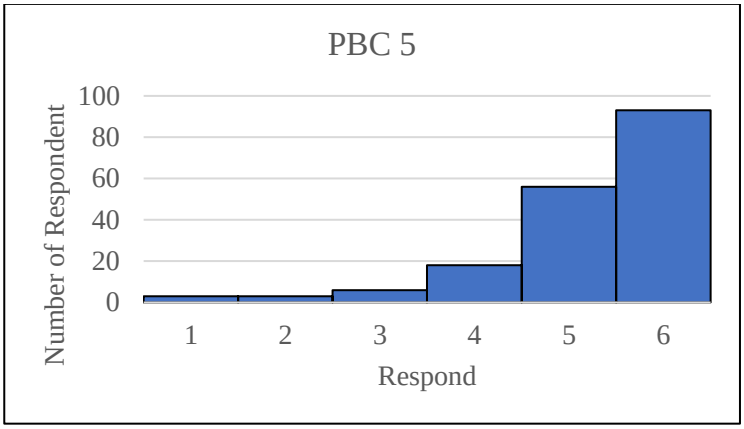

Figure 4.8 Result of PBC5 Questionnaire

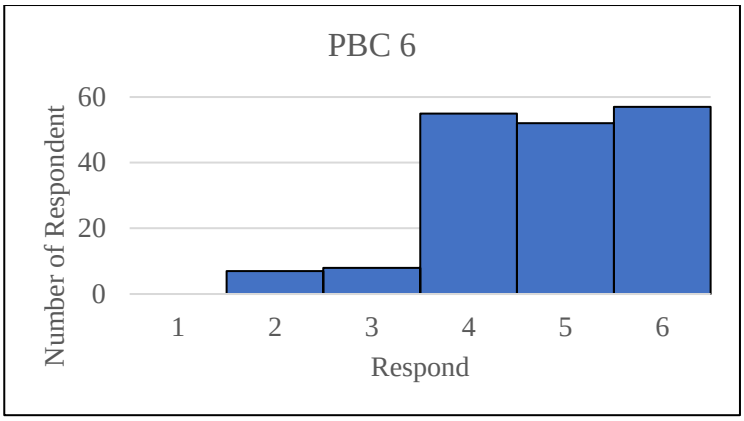

Figure 4.9 Result of PBC6 Questionnaire

Below are the recapitulation and graphical representation of data collection for personal innovativeness factor and its measured variables.

Table 4.3 Indicators of Personal Innovativeness

CODE	Indicator
PI 1	Tendency to experiment new technology
PI 2	First one to try out new technology
PI 3	Having experience with various type of technology
PI 4	No hesitation to use new technology
PI 5	Willingness to put effort in experimenting with new technology

Table 4.4 Questionnaire Recapitulation for PI's Measured Variables

Percentage of Answer									
Variable	1	2	3	4	5	6	Mode	Median	Mean
PI1	1.1%	2.8%	16.2%	14.0%	33.5%	32.4%	5	5	4.7
PI2	7.3%	9.5%	27.9%	23.5%	18.4%	13.4%	3	4	3.8
PI3	2.2%	6.1%	9.5%	22.9%	31.3%	27.9%	5	5	4.6
PI4	1.7%	7.8%	6.7%	23.5%	34.6%	25.7%	5	5	4.6
PI5	0.0%	3.4%	7.3%	25.7%	34.1%	29.6%	5	5	4.8

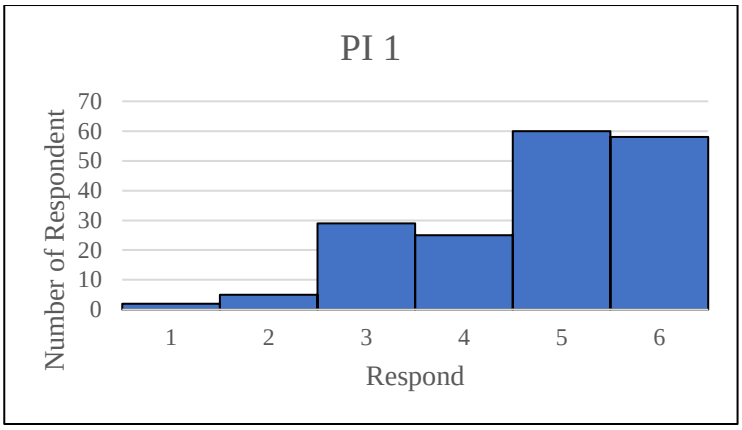

Figure 4.10 Result of PI1 Questionnaire

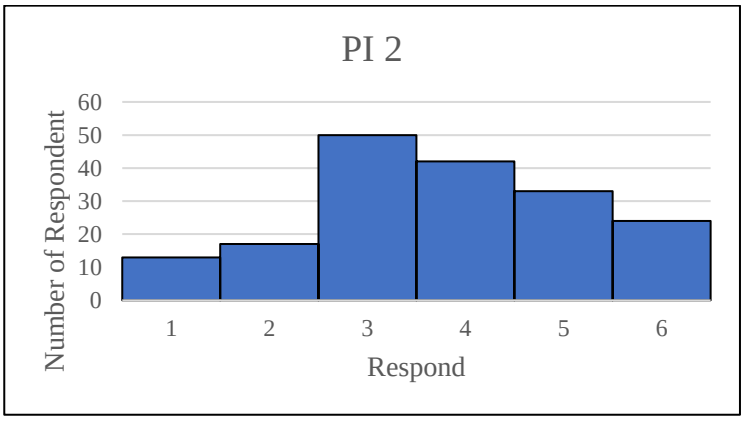

Figure 4.11 Result of PI2 Questionnaire

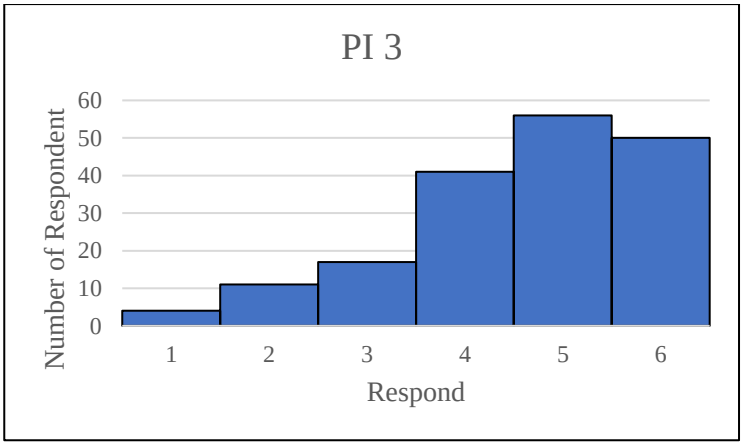

Figure 4.12 Result of PI3 Questionnaire

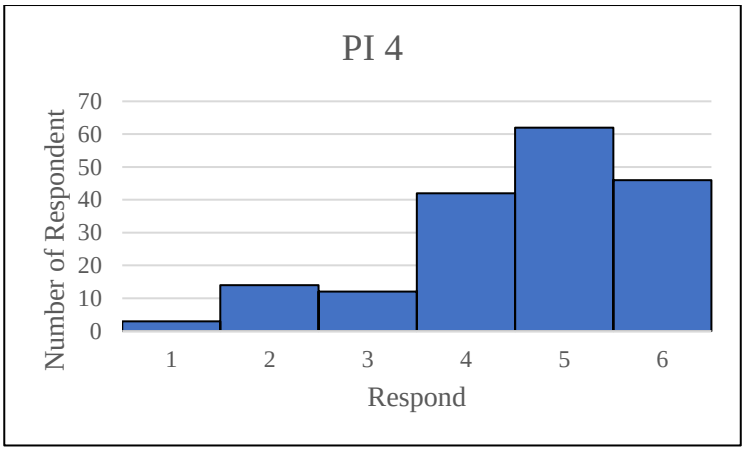

Figure 4.13 Result of PI4 Questionnaire

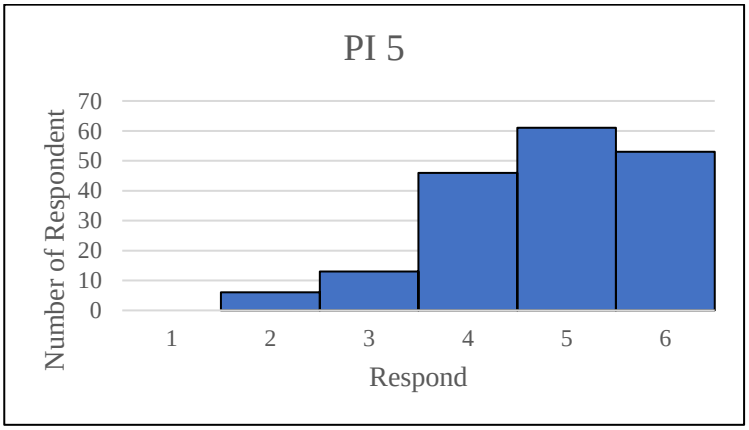

Figure 4.14 Result of PI5 Questionnaire

Below are the recapitulation and graphical representation of data collection for perceived security factor and its measured variables.

Table 4.5 Indicators of Perceived Security

CODE	Indicator
PS 1	Safe data storage
PS 2	Existence of mechanism to address potential violation
PS 3	Right to verify or correct information before finalize action
PS 4	Credibility of e-wallet provider
PS 5	Credibility of system owner

Table 4.6 Questionnaire Recapitulation for PS's Measured Variables

Percentage of Answer									
Variable	1	2	3	4	5	6	Mode	Median	Mean
PS1	1.1%	2.8%	13.4%	37.4%	28.5%	16.8%	4	4	4.4
PS2	1.7%	3.4%	18.4%	33.5%	29.1%	14.0%	4	4	4.3
PS3	0.0%	0.6%	5.0%	17.3%	32.4%	44.7%	6	5	5.2
PS4	1.1%	1.7%	10.6%	27.4%	33.5%	25.7%	5	5	4.7
PS5	3.4%	8.9%	15.6%	26.8%	29.6%	15.6%	5	4	4.2

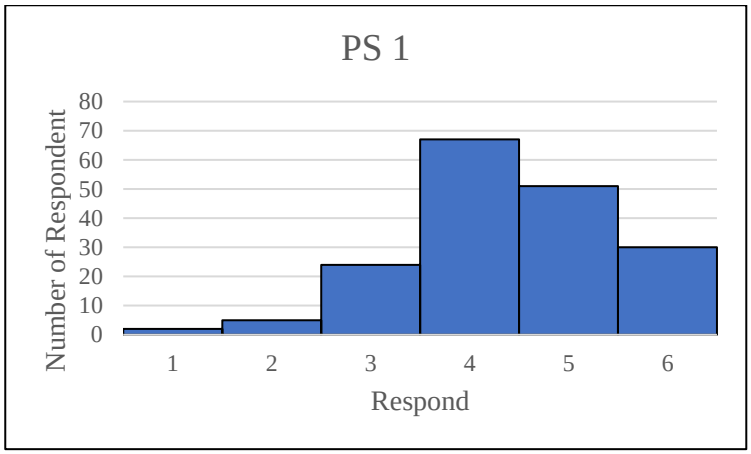

Figure 4.15 Result of PS1 Questionnaire

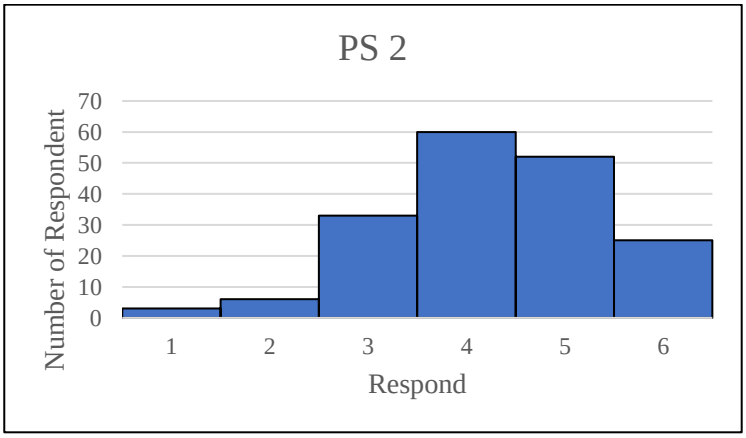

Figure 4.16 Result of PS2 Questionnaire

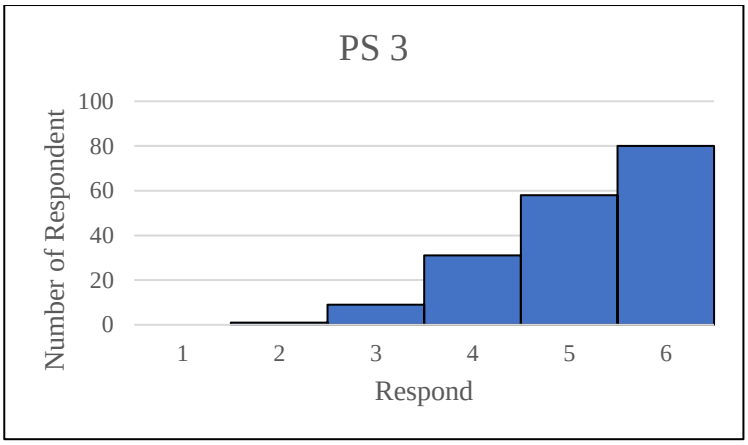

Figure 4.17 Result of PS3 Questionnaire

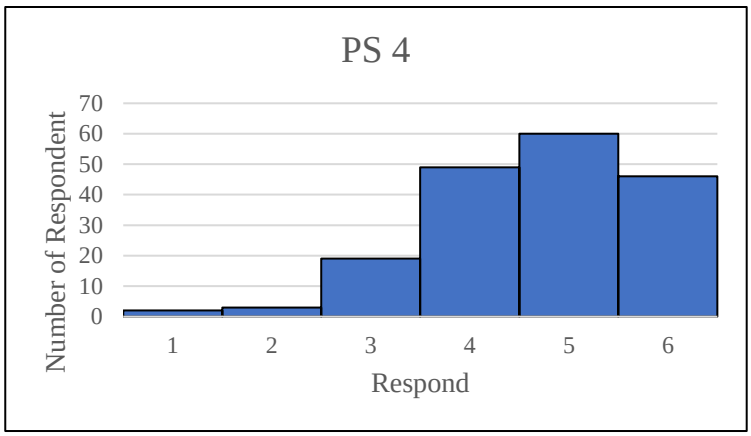

Figure 4.18 Result of PS4 Questionnaire

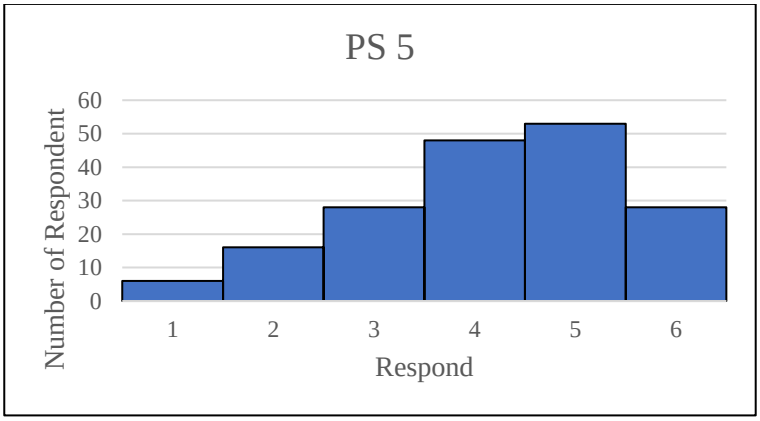

Figure 4.19 Result of PS5 Questionnaire

Below are the recapitulation and graphical representation of data collection for PBC factor and its measured variables.

Table 4.7 Indicators of Communication anf Information

CODE	Indicator
CI 1	Presence of offline information media (direct demonstration, presentation, or newsletter)
CI 2	Presence of online information media
CI 3	Sufficient amount of information
CI 4	Newness of information
CI 5	Level of easiness to understand information given

Table 4.8 Questionnaire Recapitulation for CI's Measured Variables

Percentage of Answer									
Variable	1	2	3	4	5	6	Mode	Median	Mean
CI1	0.6%	3.4%	13.4%	25.7%	30.2%	26.8%	5	5	4.6
CI2	0.0%	0.6%	2.8%	14.0%	36.9%	45.8%	6	5	5.3
CI3	0.0%	0.0%	3.9%	13.4%	24.0%	58.7%	6	6	5.4
CI4	0.0%	0.6%	3.9%	16.2%	25.1%	54.2%	6	6	5.3
CI5	0.0%	0.6%	4.5%	19.6%	31.8%	43.6%	6	5	5.1

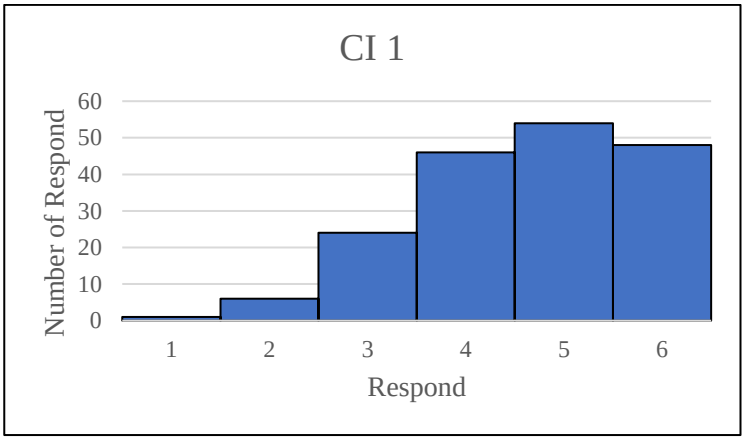

Figure 4.20 Result of CI1 Questionnaire

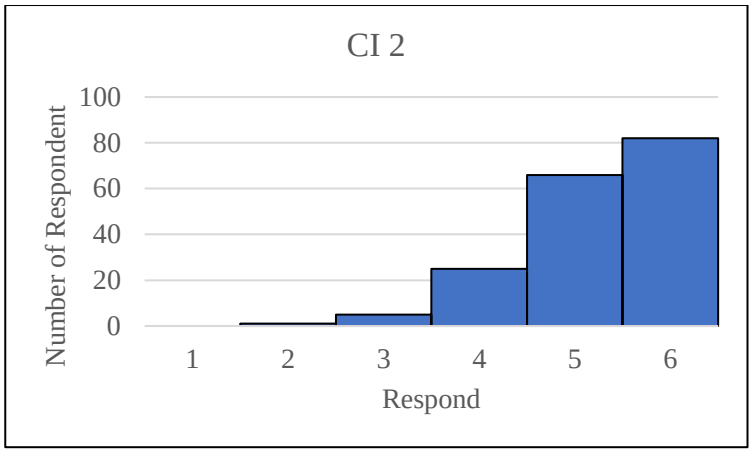

Figure 4.21 Result of CI2 Questionnaire

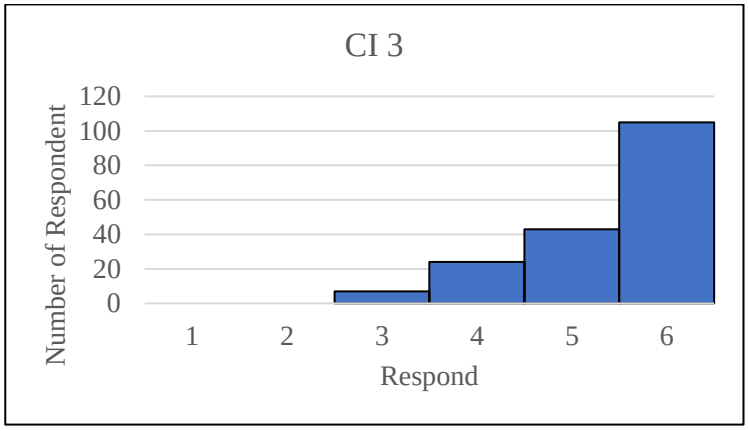

Figure 4.22 Result of CI3 Questionnaire

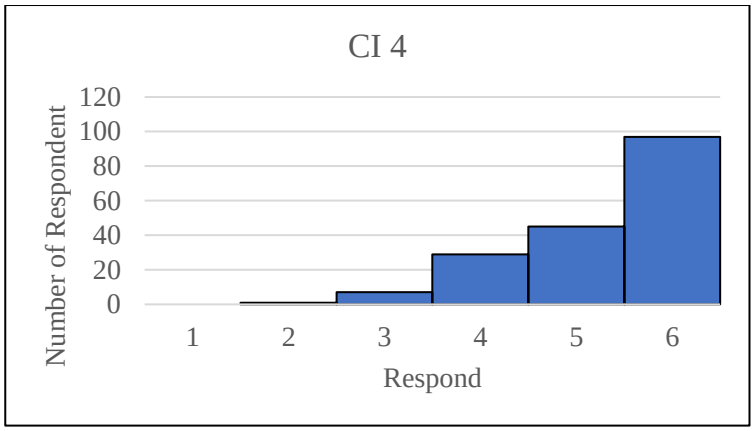

Figure 4.23 Result of CI4 Questionnaire

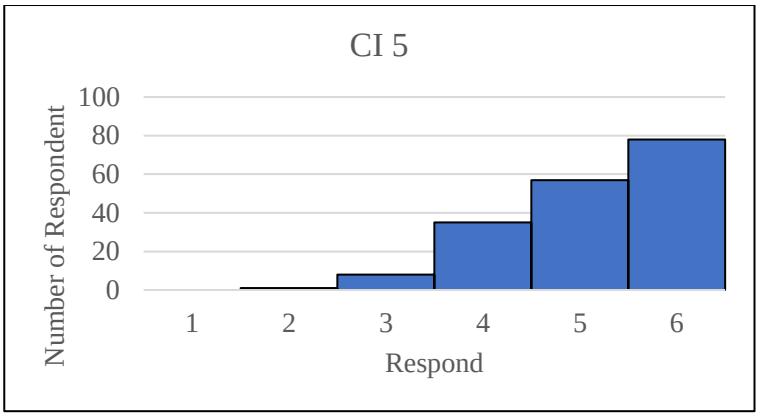

Figure 4.24 Result of CI5 Questionnaire

Below are the recapitulation and graphical representation of data collection for relative advantage factor and its measured variables.

Table 4.9 Indicators of Relative Advantage

CODE	Indicator
RA 1	Convenience to use
RA 2	Provide better price
RA 3	Conduct task more quickly
RA 4	Perception of good substitute

Table 4.10 Questionnaire Recapitulation for RA's Measured Variables

Percentage of Answer									
Variable	1	2	3	4	5	6	Mode	Median	Mean
RA1	1.7%	2.2%	11.2%	27.9%	27.9%	29.1%	6	5	4.7
RA2	2.2%	1.1%	5.6%	20.1%	31.3%	39.7%	6	5	5.0
RA3	0.6%	0.6%	10.1%	19.0%	29.1%	40.8%	6	5	5.0
RA4	0.6%	2.8%	9.5%	21.2%	36.3%	29.6%	5	5	4.8

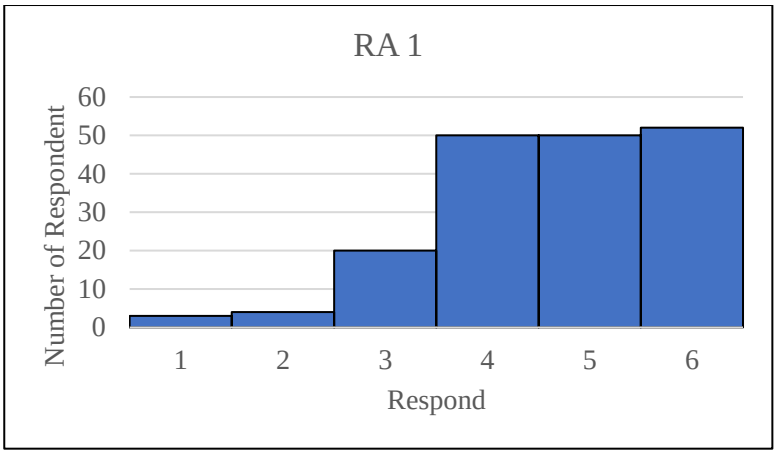

Figure 4.25 Result of RA1 Questionnaire

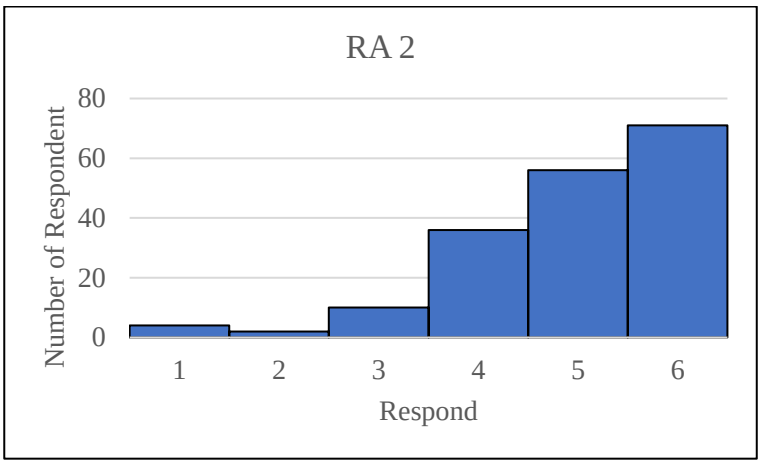

Figure 4.26 Result of RA2 Questionnaire

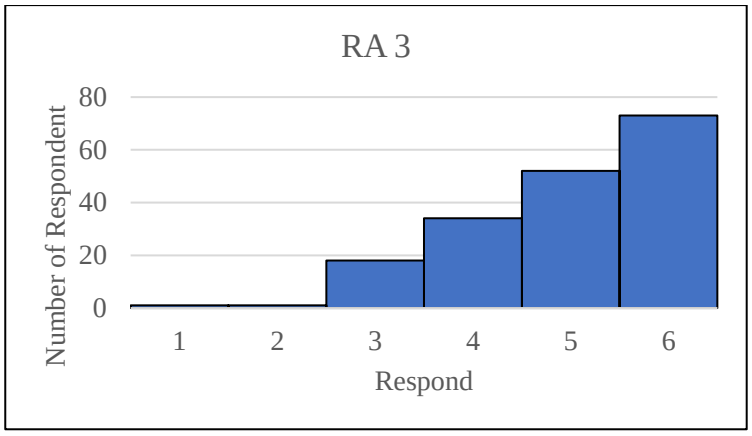

Figure 4.27 Result of RA3 Questionnaire

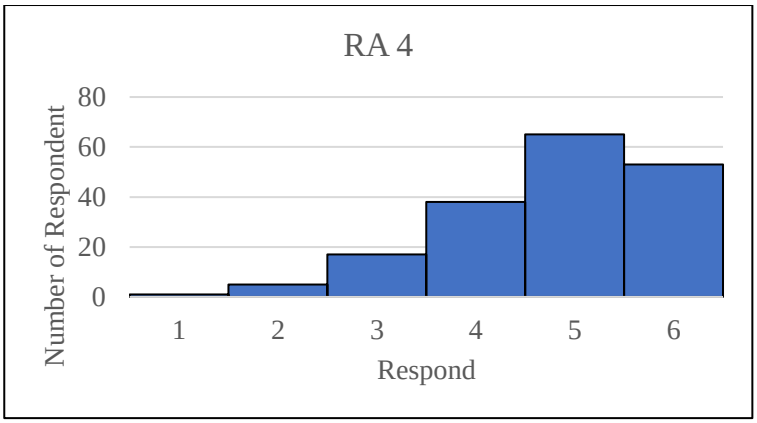

Figure 4.28 Result of RA4 Questionnaire

Below are the recapitulation and graphical representation of data collection for behavioral factor and its measured variables.

Table 4.11 Indicators of Behavioral Intention

CODE	Indicator
BI 1	Anticipation to use (first time)
BI 2	Plan to use (first time)
BI 3	Plan to frequent use
BI 4	Plan to constant use
BI 5	Tendency to recommend to others

Table 4.12 Questionnaire Recapitulation for BI's Measured Variables

Percentage of Answer									
Variable	1	2	3	4	5	6	Mode	Median	Mean
BI1	0.0%	2.8%	8.4%	21.8%	39.7%	27.4%	5	5	4.8
BI2	0.6%	0.6%	6.7%	22.9%	39.7%	29.6%	5	5	4.9
BI3	0.0%	1.1%	14.0%	30.7%	31.3%	22.9%	5	5	4.6
BI4	0.0%	3.4%	14.0%	35.8%	27.4%	19.6%	4	4	4.5
BI5	0.6%	0.6%	11.7%	27.9%	35.2%	24.0%	5	5	4.7

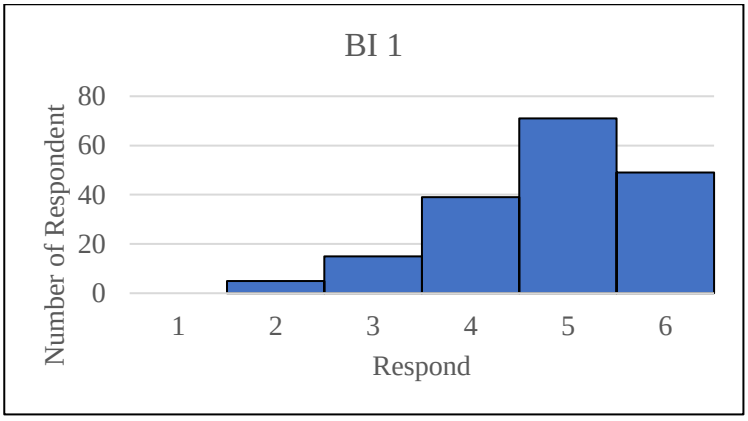

Figure 4.29 Result of BI1 Questionnaire

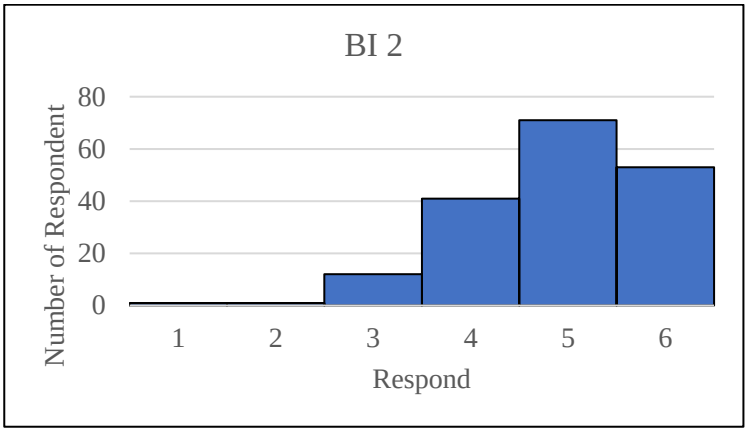

Figure 4.30 Result of BI2 Questionnaire

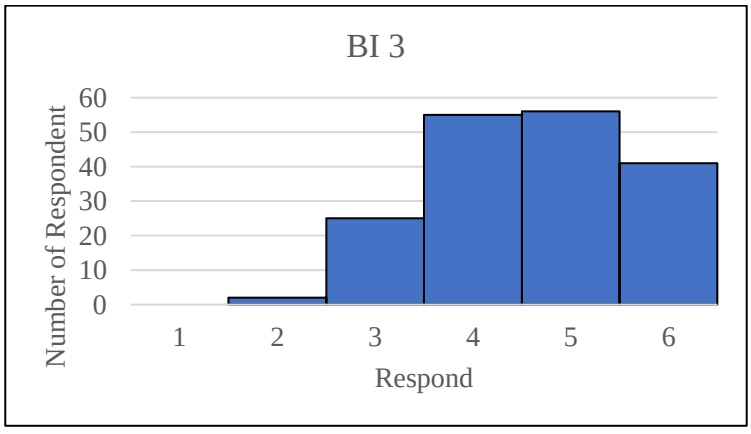

Figure 4.31 Result of BI3 Questionnaire

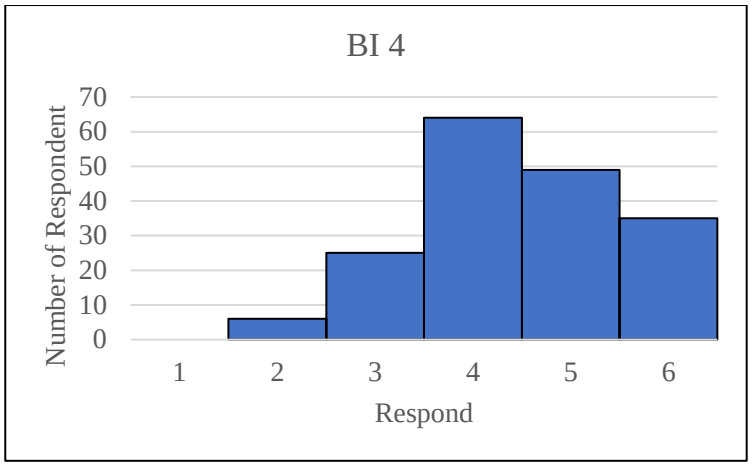

Figure 4.32 Result of BI4 Questionnaire

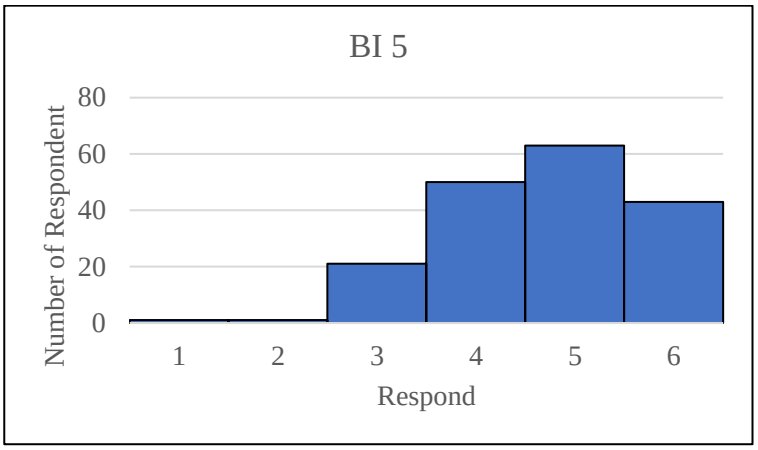

Figure 4.33 Result of BI5 Questionnaire

4.2 Data Processing

First step in data processing is to check normality of data, especially multivariate normality. This assumption will determine estimation method that should be used in creating covariance matrix as based of structural equation modelling. Result of normality test is presented below.

Table 4.13 Result of Univariate Normality Test

Univariate Normality Test		
Variable	P Value	Normal?
PBC1	0.000	No
PBC2	0.000	No
PBC3	0.000	No

Table 4.13 Result of Univariate Normality Test (cont)

Univariate Normality Test		
Variable	P Value	Normal?
PBC4	0.000	No
PBC5	0.000	No
PBC6	0.009	No
PI1	0.001	No
PI2	0.016	No
PI3	0.000	No
PI4	0.000	No
PI5	0.003	No
PS1	0.119	Yes
PS2	0.173	Yes
PS3	0.000	No
PS4	0.002	No
PS5	0.014	No
CI1	0.013	No
CI2	0.000	No
CI3	0.000	No
CI4	0.000	No
CI5	0.000	No
RA1	0.003	No
RA2	0.000	No
RA3	0.000	No
RA4	0.000	No
BI1	0.002	No
BI2	0.000	No
BI3	0.000	No
BI4	0.061	Yes
BI5	0.044	No

Table 4.14 Result of Multivariate Normality Test

Multivariate Normality Test		
Variable	P Value	Normal?
All	0.000	No

Both univariate and multivariate normality are tested using LISREL software. P-value, that is taken into consideration, is from both skewness and kurtosis. Confidence level of data is set to be 95%. P-value below alpha (1 – confidence level) means that no normality is detected in data set. Univariate test result shows that out of 30 measured variables, only 3 out of them are normally distributed. Meanwhile, multivariate test result also does not show any normality.

This indicates that the most common estimation method in SEM, which is Maximum Likelihood (ML), cannot be used. ML can only be used when data is multivariate normal, since it used normality assumption in generating estimated covariance matrix for SEM analysis. Violation to this assumption will most likely cause model misfit. In LISREL, there are other options for estimation method, which are robust maximum likelihood (RML) and least-square series (generalized least square, weighted least square, diagonally weighted least square, and unweighted least square). RML is modification of ML, however it gives flexibility to deal with non-normal data.

In this research, RML is used to generate estimate of model's covariance matrix. Reason of not choosing least-square series for estimation method is that it requires large sample size, meanwhile number of sample available to analyzed is only 179. Least-square estimation methods for this model with 6 constructs and 30 measured variables, require minimum of 300 samples to be run. LISREL will give warning in the output window if the model run with less than 300 samples. It requires even more sample to ensure better fit for model.

4.2.1 Measurement Model Testing

First parameter that has to be analyzed in measurement model testing is standardized loading of each measured variables. It represents convergent validity, which is the degree for indicators of a specific construct to converge or to share a

high proportion of variance in common. Cut off value for standardized loading is 0.5 (Hair, et al., 2014). Measured variable with standardized loading below cut off value must be removed from the model.

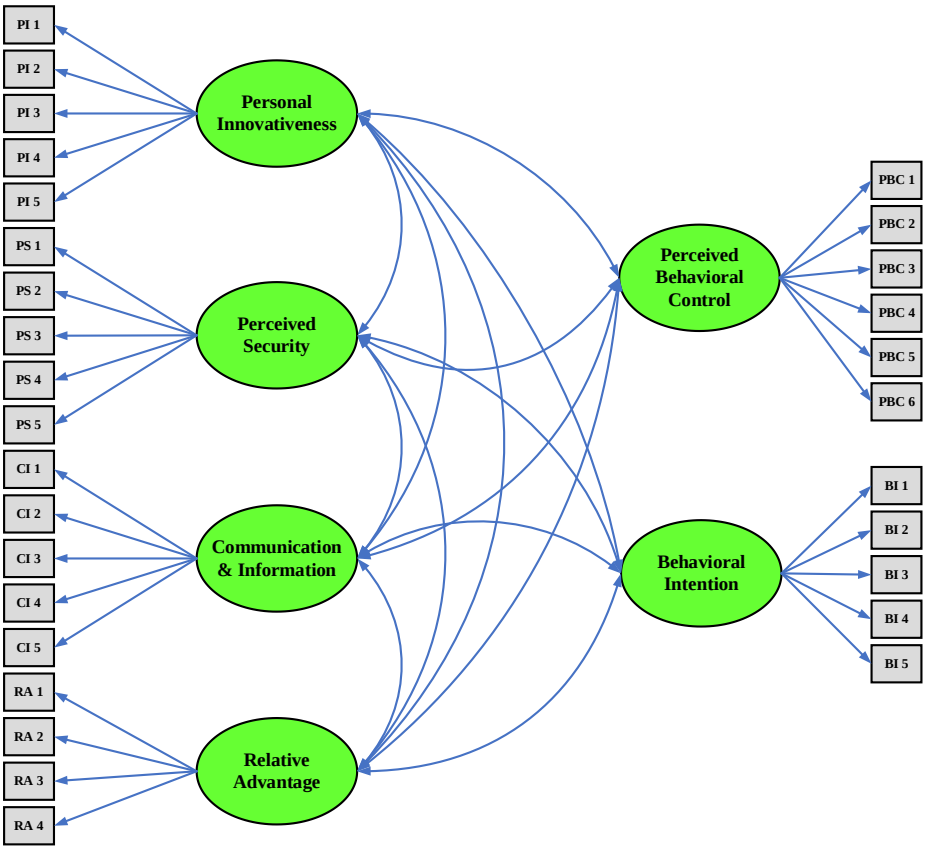

Figure 4.34 Initial Measurement Model

Below is recapitulation for standardized loading, T-value, and standardized error of each variable in initial structural model.

Table 4.15 Standardized Loading, T-value, and Standardized Error of Initial Structural Model

Variable	Standardized Loading	T-value	Standardized Error	Pass?
PBC1	0.68	9.56	0.54	Yes
PBC2	0.77	11.16	0.41	Yes
PBC3	0.84	9.99	0.29	Yes
PBC4	0.78	11.36	0.39	Yes
PBC5	0.23	2.86	0.95	No

Table 4.15 Standardized Loading, T-value, and Standardized Error of Initial Structural Model (cont)

Variable	Standardized Loading	T-value	Standardized Error	Pass?
PBC6	0.30	3.88	0.91	No
PI1	0.75	9.99	0.44	Yes
PI2	0.73	9.39	0.47	Yes
PI3	0.73	9.45	0.46	Yes
PI4	0.73	9.35	0.47	Yes
PI5	0.76	9.82	0.42	Yes
PS1	0.84	9.99	0.29	Yes
PS2	0.81	11.25	0.35	Yes
PS3	0.49	6.52	0.75	No
PS4	0.55	7.23	0.70	Yes
PS5	0.55	7.35	0.69	Yes
CI1	0.28	3.47	0.92	No
CI2	0.66	9.99	0.56	Yes
CI3	0.82	9.18	0.33	Yes
CI4	0.88	9.57	0.22	Yes
CI5	0.54	6.50	0.70	Yes
RA1	0.80	11.52	0.36	Yes
RA2	0.61	8.34	0.63	Yes
RA3	0.66	9.17	0.56	Yes
RA4	0.83	9.99	0.32	Yes
BI1	0.76	13.18	0.43	Yes
BI2	0.81	15.05	0.34	Yes
BI3	0.94	9.99	0.17	Yes
BI4	0.88	18.04	0.22	Yes
BI5	0.86	16.85	0.27	Yes

Convergent validity is also measured through average variance extracted (AVE) and construct reliability (CR). AVE is a summary measure of convergence

among a set of items representing a latent construct. It is the average percentage of variation explained (*variance extracted*) among the items of a construct (Hair, et al., 2014). A good AVE value that represent construct's convergent validity is 0.5 and above. AVE is calculated using formula below.

$$AVE = \frac{\sum_{i=1}^{n} L_i^2}{n} \quad (4.1)$$

Note:

L = standardized factor loading for measured variable i

i = -th measured variable

n = number of measured variables within a construct

Meanwhile, CR is a measure of reliability and internal consistency of the measured variables. A good CR value that represent construct's convergent validity is 0.7 and above. CR is calculated using formula below.

$$CR = \frac{(\sum_{i=1}^{n} L_i)^2}{(\sum_{i=1}^{n} L_i)^2 + (\sum_{i=1}^{n} e_i)} \quad (4.2)$$

Note:

L = standardized factor loading for measured variable i

e = standardized error for measured variable i

i = -th measured variable

n = number of measured variable within a construct

Result of AVE and CR calculation for initial structural model are presented in table below.

Table 4.16 Convergent Validity Test Result of Initial Structural Model

Convergent Validity			
Factor	AVE	CR	CV
PBC	0.42	0.79	NO
PI	0.55	0.86	YES

Table 4.16 Convergent Validity Test Result of Initial Structural Model (con't)

Convergent Validity			
Factor	AVE	CR	CV
PS	0.44	0.79	NO
CI	0.45	0.79	NO
RA	0.53	0.76	YES
BI	0.73	0.96	YES

Other type of validity that must be analyzed in assessing construct validity is discriminant validity. Discriminant validity (DV) measures extent to which a construct is truly distinct from other constructs. A construct is said to be discriminant valid when the construct AVE of the construct is greater than squared correlation with other constructs. Result of discriminant validity test is recapitulated in table below.

Table 4.17 Discriminant Validity Test Result of Initial Structural Model

Discriminant Validity						
Factor	AVE	Correlation	Correlation ^2	Between		DV
PBC	0.42	0.6	0.36	PBC	PI	YES
		0.38	0.14	PBC	PS	YES
		0.52	0.27	PBC	CI	YES
		0.36	0.13	PBC	RA	YES
		0.4	0.16	PBC	BI	YES
PI	0.55	0.6	0.36	PI	PBC	YES
		0.59	0.35	PI	PS	YES
		0.38	0.14	PI	CI	YES
		0.4	0.16	PI	RA	YES
		0.51	0.26	PI	BI	YES
PS	0.44	0.38	0.14	PS	PBC	YES
		0.59	0.35	PS	PI	YES
		0.51	0.26	PS	CI	YES

Table 4.17 Discriminant Validity Test Result of Initial Structural Model (con't)

Discriminant Validity						
Factor	AVE	Correlation	Correlation ^2	Between		DV
		0.55	0.30	PS	RA	YES
		0.61	0.37	PS	BI	YES
CI	0.45	0.52	0.27	CI	PBC	YES
		0.38	0.14	CI	PI	YES
		0.51	0.26	CI	PS	YES
		0.6	0.36	CI	RA	YES
		0.56	0.31	CI	BI	YES
RA	0.53	0.36	0.13	RA	PBC	YES
		0.4	0.16	RA	PI	YES
		0.55	0.30	RA	PS	YES
		0.6	0.36	RA	CI	YES
		0.82	0.67	RA	BI	NO
BI	0.73	0.4	0.16	BI	PBC	YES
		0.51	0.26	BI	PI	YES
		0.61	0.37	BI	PS	YES
		0.56	0.31	BI	CI	YES
		0.82	0.67	BI	RA	YES

To assess validity of a structural model, analysis on goodness of fit test should also be done. According to Hair, et al (2014), goodness of fit analysis should include minimum of chi square statistic, one absolute fit indices, and one incremental fit indices. However, in this research, chi square statistic is excluded as it heavily relies on normality assumption and number of sample size (Hooper, et al., 2008). A model with non-normal dataset and 179 samples will nearly always be rejected although other goodness of fit parameters may show a contrary result. Another criteria that can replace the chi square is ration between chi square and degree of freedom or known as normed chi square (Wheaton, et al., 1977). Good fit

value for this parameter ranges from 2.0 (Tabachnick & Fidell, 2006) to 5.0 (Wheaton, et al., 1977).

Table 4.18 Goodness of Fit Test Result of Initial Structural Model

Goodness of Fit Test				
Category	Parameter	Value	Cut Off Value	Fit?
Chi Square	χ^2/df	2.77	≤3	YES
Absolute Fit	RMSEA	0.1	≤0.1	YES
	SRMR	0.094	≤0.08	NO
Incremental Fit	NFI	0.89	≥0.9	NO
	NNFI	0.92	≥0.95	NO
Parsimony Fit	CFI	0.93	≥0.95	NO
	PNFI	0.8	0.5	YES

In here, it can be seen that some constructs do not meet construct validity criteria. It means structural model has to be modified. If there is only less than 20% of total measured variables that is being modified, first modification option is to remove measured variables that does not meet cut off value for standardized loading. If portion of modification is more than 20%, the second modification option is to entirely change or build new measurement model. The modification is started by removing PBC5, PB6, PS3, and CI1.

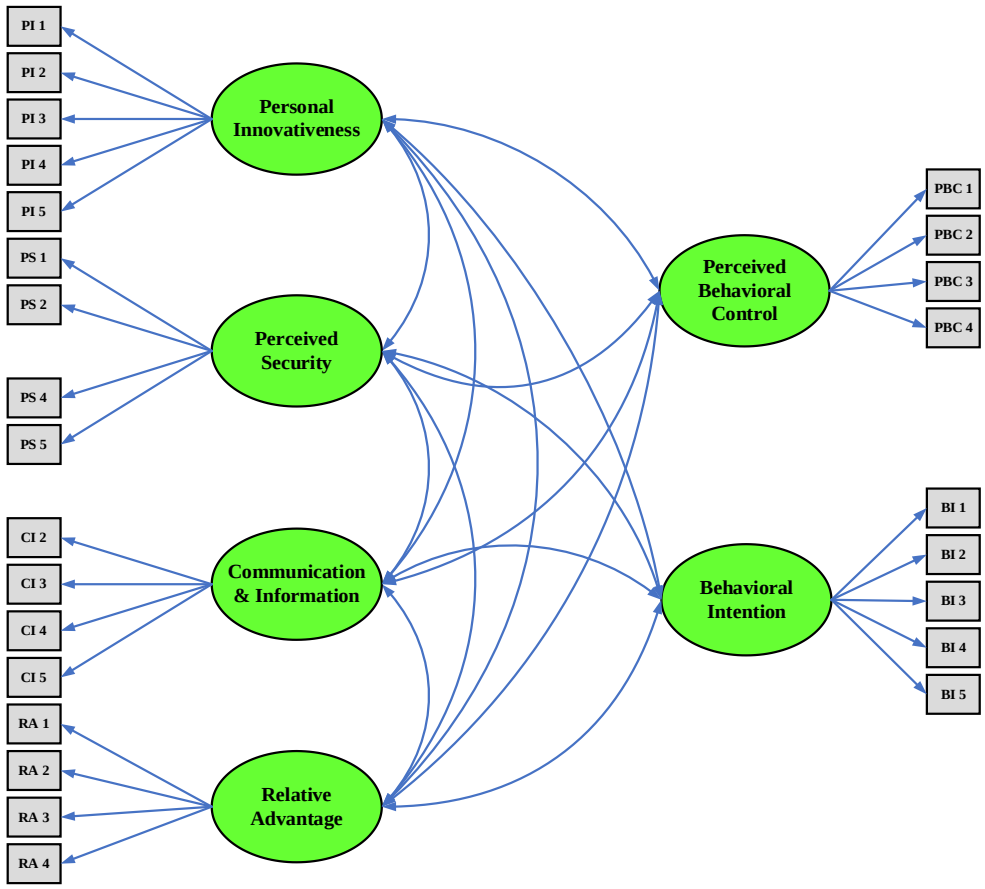

Figure 4.35 Modified Measurement Model

Standardized loading, t value, and standardized error result for modified model are presented in table below.

Table 4.19 Standardized Loading, T-value, and Standardized Error of Modified Measurement Model

CFA using RML				
Variable	Standardized Loading	T-value	Standardized Error	Pass?
PBC1	0.74	9.31	0.45	Yes
PBC2	0.87	10.30	0.24	Yes
PBC3	0.74	9.99	0.45	Yes
PBC4	0.62	10.92	0.62	Yes
PI1	0.77	9.99	0.4	Yes

Table 4.19 Standardized Loading, T-value, and Standardized Error of Modified Measurement Model (cont)

CFA using RML				
Variable	Standardized Loading	T-value	Standardized Error	Pass?
PI2	0.75	9.79	0.43	Yes
PI3	0.74	9.66	0.45	Yes
PI4	0.67	8.59	0.55	Yes
PI5	0.71	9.12	0.50	Yes
PS1	0.86	9.99	0.26	Yes
PS2	0.81	11.30	0.34	Yes
PS4	0.53	7.03	0.72	Yes
PS5	0.56	7.42	0.69	Yes
CI2	0.66	9.99	0.57	Yes
CI3	0.82	9.08	0.33	Yes
CI4	0.89	9.44	0.21	Yes
CI5	0.54	6.43	0.71	Yes
RA1	0.80	11.46	0.37	Yes
RA2	0.62	8.44	0.62	Yes
RA3	0.66	9.15	0.56	Yes
RA4	0.82	9.99	0.32	Yes
BI1	0.77	12.42	0.41	Yes
BI2	0.82	13.95	0.32	Yes
BI3	0.88	9999	0.23	Yes
BI4	0.84	19.84	0.33	Yes
BI5	0.86	15.16	0.26	Yes

After PBC5, PBC6, PS3, and CI1 are removed from the measurement model, there are slight changes appear in the value of the existing measured variables. All the remaining 26 variables have met the cut off value. Then, the assessment can be continued to the calculation of other convergent validity

parameters, which are AVE and CR. The result of new AVE and CR for each construct are presented in table below.

Table 4.20 Convergent Validity Test Result of Modified Measurement Model

Convergent Validity			
Factor	AVE	CR	CV
PBC	0.56	0.83	YES
PI	0.53	0.85	YES
PS	0.50	0.79	YES
CI	0.55	0.82	YES
RA	0.53	0.76	YES
BI	0.70	0.93	YES

All constructs in the modified model have met standardized loading, average variance extracted, and construct reliability, meaning that all measured variables represent the construct well. It indicates that measurement model is convergent valid. The assessment should be carried out to the next validity test which are discriminant validity. Result of discriminant validity test for modified measurement model is represented in table below.

Table 4.21 Discriminant Validity Test Result of Modified Measurement Model

Discriminant Validity						
Factor	AVE	Correlation	Correlation ^2	Between		DV
PBC	0.56	0.54	0.29	PBC	PI	YES
		0.4	0.16	PBC	PS	YES
		0.56	0.31	PBC	CI	YES
		0.38	0.14	PBC	RA	YES
		0.42	0.18	PBC	BI	YES
PI	0.53	0.54	0.29	PI	PBC	YES
		0.54	0.29	PI	PS	YES
		0.34	0.12	PI	CI	YES

Table 4.21 Discriminant Validity Test Result of Modified Measurement Model (con't)

Discriminant Validity						
Factor	AVE	Correlation	Correlation ^2	Between		DV
PI	0.53	0.4	0.16	PI	RA	YES
		0.52	0.27	PI	BI	YES
PS	0.50	0.4	0.16	PS	PBC	YES
		0.54	0.29	PS	PI	YES
		0.46	0.21	PS	CI	YES
		0.53	0.28	PS	RA	YES
		0.62	0.38	PS	BI	YES
CI	0.55	0.56	0.31	CI	PBC	YES
		0.34	0.12	CI	PI	YES
		0.46	0.21	CI	PS	YES
		0.59	0.35	CI	RA	YES
		0.57	0.32	CI	BI	YES
RA	0.53	0.38	0.14	RA	PBC	YES
		0.4	0.16	RA	PI	YES
		0.53	0.28	RA	PS	YES
		0.59	0.35	RA	CI	YES
		0.82	0.67	RA	BI	NO
BI	0.70	0.42	0.18	BI	PBC	YES
		0.52	0.27	BI	PI	YES
		0.62	0.38	BI	PS	YES
		0.57	0.32	BI	CI	YES
		0.82	0.67	BI	RA	YES

Out of 30 relationship tested, almost all relationship tests positive for discriminant validity. There is 1 relationship that does not pass discriminant validity which are RA from relationship RA to BI. Discriminant validity is meant to test whether a construct is genuinely different from other constructs. Although in RA perspective, the test shows that there is similarity between RA and BI, in BI

perspective the similarity is not proven. In example presented by Hair (2014) in his book, minor rejection outcome can be neglected. Although deeper analysis should be conducted to examine this relationship, the overall discriminant validity shows that measurement model is discriminant valid.

Next step is to analyze goodness of fit test result of the modified model. After modification, all parameter met the required cut off value, indicating that measurement model has a good fit. Result of goodness of fit test is presented in table below.

Table 4.22 Goodness of Fit Test Result of Modified Measurement Model

Goodness of Fit Test				
Category	Parameter	Value	Cut Off Value	Fit?
Chi Square	χ^2/df	2.20	≤3	YES
Absolute Fit	RMSEA	0.082	≤0.1	YES
	SRMR	0.076	≤0.08	YES
Incremental Fit	NFI	0.92	≥0.9	YES
	NNFI	0.95	≥0.95	YES
Parsimony Fit	CFI	0.95	≥0.95	YES
	PNFI	0.79	≥0.5	YES

4.2.2 Structural Model Testing

Structural model is built based on modified measurement model. The model is built by removing correlation between each construct with hypothesized relationship. In total, there are 7 hypotheses that are trying to be developed, which are RA→BI, PBC→BI, PI→BI, PI→PBC, PS→BI, CI→BI, and CI→PBC. Although the correlation between each construct is replaced by structural path, structural model should yield very similar factor loading outcome compared to modified measurement model to prove model's consistency.

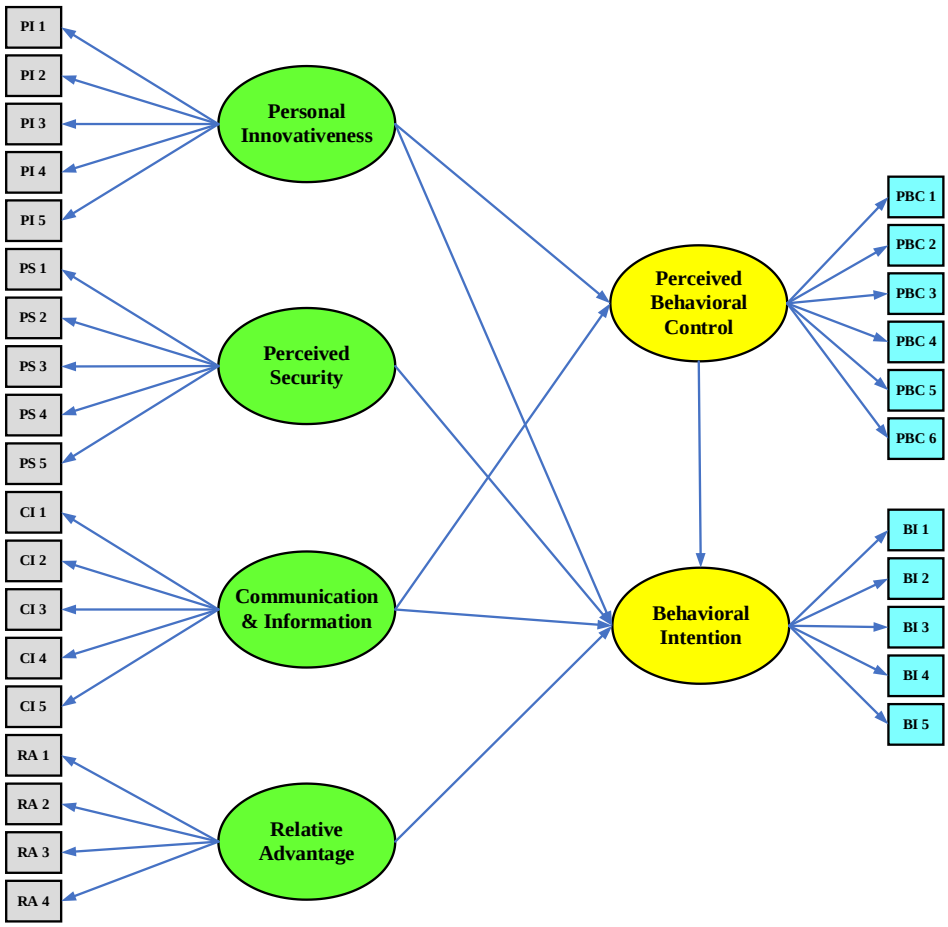

Figure 4.36 Structural Model

Goodness of fit test should also be conducted in structural model with same parameter and cutoff value to check if that whole model proposed has represented the data well. Result of goodness fit test for structural model is presented in table below.

Table 4.23 Goodness of Test Result of Structural Model

Goodness of Fit Test				
Category	Parameter	Value	Cut Off Value	Fit?
Chi Square	χ^2/df	2.19	≤3	YES
Absolute Fit	RMSEA	0.082	≤0.1	YES
	SRMR	0.076	≤0.08	YES
Incremental Fit	NFI	0.92	≥0.9	YES
	NNFI	0.95	≥0.95	YES

Table 4.23 Goodness of Test Result of Structural Model (con't)

Goodness of Fit Test				
Category	Parameter	Value	Cut Off Value	Fit?
Parsimony	CFI	0.96	≥0.95	YES
	PNFI	0.8	≥0.5	YES

4.2.3 Hypothesis Testing

When structural model has met required goodness of fit parameter, research can be continued to analyze structural path or proposed hypothesis.

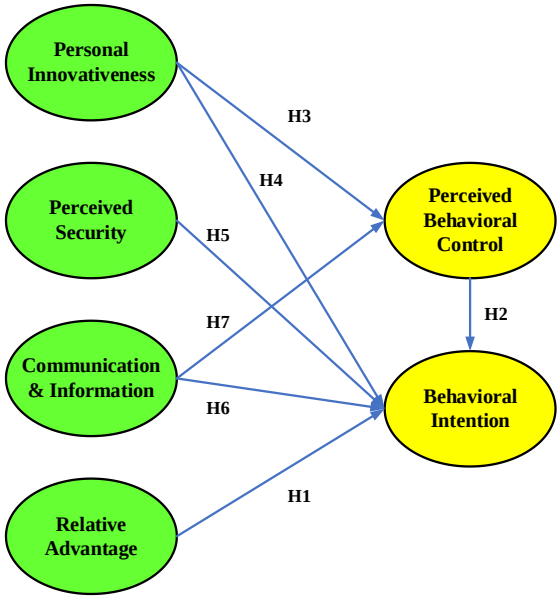

Figure 4.37 Research Hypothesis

First point that has to be examined in SEM hypothesis testing is path coefficient or path estimate. Value of path estimate has to be positive to represent a positive relation in the hypothesis. In the figure above, path coefficient from PBC to BI is negative, indicating that hypothesis is not supported.

T-test should also be conducted to test significance of each hypothesis. T-test is able to run on non-normal data when the sample size is large enough (above 50) (Lumley, et al., 2002) (Minitab, 2015). Hypothesis test is done by comparing t-value from the test and t-statistic. T-statistic is calculated using online t-value calculator. With 5% significance level and 282 degrees of freedom, it is found that

the t-statistic is at 1.96 for 2 tailed test (Student t-Value Calculator, 2020). T-value from test below 1.96 indicates that hypothesis should be rejected and vice versa.

Table 4.24 Hypothesis Test Result

Code	Hypothesis	T-value	Accepted?
H1	Relative advantage positively influences behavioral intention	7.35	Yes
H2	Perceived behavioral control positively influences behavioral intention	-0.43	No
H3	Personal innovativeness positively influences perceived behavioral control	4.56	Yes
H4	Personal innovativeness positively influences behavioral intention	2.12	Yes
H5	Perceived security positively influences behavioral intention	2.1	Yes
H6	Communication and information positively influences behavioral intention	0.81	No
H7	Communication and information positively influences perceived behavioral control	4.65	Yes

Consistent with path coefficient result, t-test shows that H6 are below cutoff value meaning that the hypothesis should be rejected. In addition, there is no sufficient evidence to not reject H2. Therefore, H2 is also rejected. This indicates that user's intention to use digital parking system is not influenced by perceived behavioral control and communication and information.

4.2.4 Direct and Indirect Effect

Direct effect and indirect effect are calculated based on path coefficient / factor loading. Direct effect happens when, within a path, a factor is directly correlate with another factor without having to go through another factor in between. Inversely, indirect effect happens when there is mediating factor between path that want to be analyzed. A path can have both direct effect and indirect effect.

Direct effect is obtained from path coefficient / factor loading, while indirect effect is obtained from multiplication of several path coefficients that support the path. Total effect is the sum of direct path and indirect path.

Table 4.25 Direct Effect, Indirect Effect, and Total Effect of Path

Path	Direct Path	Direct Effect	Indirect Path	Indirect Effect	Total Effect
RA → BI	RA → BI	0.67	-	-	0.67
PBC → BI	PBC → BI	-0.04	-	-	-0.04
PI → PBC	PI → PBC	0.29	-	-	0.29
PI → BI	PI → BI	0.16	(PI → PBC), (PBC → BI)	-0.01	0.15
PS → BI	PS → BI	0.16	-	-	0.16
CI → BI	CI → BI	0.11	(CI → PBC), (PBC → BI)	-0.02	0.09
CI → PBC	CI → PBC	0.53	-	-	0.53

In the model, there are 4 exogenous constructs (or mostly understood as independent variables), which are relative advantage, personal innovativeness, perceived security, and communication and information. Since the model already provide direct relation between those 4 independent variables with behavioral intention as ultimate variable of interest, effect decomposition does not have to be conducted. From total effect, relative advantage become independent variable which has highest influence on behavioral intention.

CHAPTER 5
ANALYSIS AND INTERPRETATION

This chapter will give explanation about analysis of data collection process, measurement model testing, and structural model testing.

5.1 Data Collection

Data collection process is done using Google form, since due to outbreak of COVID-19, offline survey is not feasible. The form consists of 3 parts, which are respondent characteristic, basic information about digital parking system, and SEM question. Basic information about digital parking system is provided to give more insight to respondent about feature that is presented in the digital parking system. Questionnaire also captures suggestion about the implementation of digital parking system from respondent. The questionnaire is distributed through social media to Sidoarjo citizen who have experience in using on-street parking facility in Sidoarjo. From the questionnaire distribution, 188 responds are collected. However, there are duplications (respondent under the same name) within the 188 responds and there are respondent who does not use private vehicle but still fill in the questionnaire. Those responds are deleted from the dataset because they do not meet respondent criteria, which result in 179 respond for final data to be proceeded.

5.1.1 Input Data Characteristic

Many statistical tests are dependent to assumption of normality. It also applies to this research, in which normality test should be conducted before any other data processing step. P-value in univariate normality of almost all measured variables are below 0.05, meaning that measured variables are not multivariate normal. This is because data from Likert scale questionnaire is are not likely to be normally distributed. Another test that should be conducted is multivariate normality test. While univariate test seeks normality in individual entity, multivariate test checks it from wider perspective as the analysis is done from multiple variable's perspective / dimension. It checks whether or not, when all variables are put together, it will create a normally distributed result in respect to

value of each measured variables. In univariate normality, it is possible that a respondent may have a great ability to operate mobile phone (PBC4), meanwhile another respondent may have little knowledge of how to operate mobile phone (PBC3). However, in multivariate normality, it is rare for someone who does not have any knowledge about mobile phone (PBC3) to have great ability in operating mobile phone application (PBC 4). P-value from multivariate normality test lies below 0.05, meaning that when all variables are analyzed at the same time, they do not create a normally distributed result. Natural characteristic of data that has high skewness and kurtosis are causing data is not normally distributed. Data are mostly centered around x-value of 5 & 6 and this makes distribution of most measured variables to be right-skewed.

Traditional believes may argue that data from Likert scale cannot be directly input to the measurement model since they are rarely normally distributed. Meanwhile, basic assumption of MLE is that data is normally distributed. To be able to use Likert scale data on MLE, data has to be transformed first using square root, log, inversed sine, or z-score equation (Stevens & Pituch, 2016). This transformation is done to achieve data normality (Wu, 2007). However, research by Mondiana, et al, (2018), proved that, for SEM case, whether data is transformed or not transformed, both will yield similar result. Different method of estimation can also be used instead of using transformation. In this research, instead of MLE, robust maximum likelihood is used to address non-normality issue in dataset.

Respondent characteristic consists of name, age, type of vehicle use, and knowledge about implementation about digital parking system. Name is included to check if there is respond under the same name that submit at similar time, as this may indicate respond duplication. Age is included to analyze behavior of different age generation. Type of vehicle is assumed to represent different preference in parking, so it is also included.

Based on age, around 86.4% of total respondent comes from <24 years old age group. The other group of age only accounts for 8.6% (40 to 55 years old) and 5% (24 to 39 years old) of total respondent. This drastic proportions may be a result of online data distribution.

According to Databoks Katadata (2019) and Statista (2019), most of internet user comes from age group of 17-25 years old, which represents 35% of total internet user in Indonesia. This idea supports condition where most of respondent are people below 24 years old, with excluding the probability of people below 16 years old also fill the questionnaire. This condition is also caused by author's social media which is mostly filled with people who come from age of 20-24 years old, thus giving more chance for people in that age range to fill in the questionnaire. The other's age group is captured from family members of author's relatives. Later it is found that age does not have significant correlation with willingness to use digital parking system (PT. ITS Tekno Sains, 2019).

Type of vehicle data shows that 62% of respondent uses only motorcycle as their means of transportation. Meanwhile, 22.3%and 15.6% of respondent uses both motorcycle and car and only car, respectively, as their means of transportation. The composition of vehicle type used by respondent is reflected from composition of vehicle in Sidoarjo Regency in which motorcycle proportion is about 2 times larger than car proportion (to total number of vehicle).

Based on user findings about proposal of digital parking system in Sidoarjo Regency, only 19% of respondent has heard about the news before becoming respondent of this research. In the implementation, many news websites, such as Republika and Jawa Pos, have posted publications about this new parking system. However, the news are mostly posted at the same time, making news about digital parking system comes only on eventual occasion. Also, there is no continual update on the digital parking system development, so people cannot keep track of the development from time to time. Another reason that may support the condition is that currently social media becomes more favorable than website for information media as it serves not only information but also flexibility to communicate with other people and easiness to share or exchange information.

5.2 Measurement Model Testing

Measurement model testing is done to ensure relation between a set of measure variables and a factor. It consists of the construct validity test (convergent validity and discriminant validity) and goodness of fit test. In data processing,

measurement model testing is done twice. It is because some measured variables do not meet the required validation parameter, so that the initial model must be modified.

5.2.1 Initial Measurement Model

A construct is said to have convergent validity when it meets cutoff value of 3 convergent validity parameters. First parameter of convergent validity is standardized loading. Standardized loading is correlation coefficient between observed variables and latent common factor (Salkind, 2010). Standardized loading is fundamental of convergent validity since the calculation of other two parameters, average variance extracted (AVE) and construct reliability (CR), are based on standardized loading value. In measurement model, standardized loading is only present in the relationship (in the path diagram it is represented in single headed arrow) between measured variables and factor. Meanwhile, in structural model, standardized loading is also present in the relationship among constructs.

According to Hair, et al (2014), standardized loading value for a measured variable must be 0.5 or higher. In initial model, measured variables that do not meet this criteria are PBC5, PBC6, PS3, and CI 1. Reason behind low standardized loading in some measured variable may come from model misspecification, which use different field of research used in adoption of indicators and measured variables, and purely representation of user behavior.

As part of CFA nature, this research tries to confirm an already established theory about relationship between factor and measured variable in a certain field of research. Therefore, this research is highly dependent to findings from previous research. However, research related to factor analysis for digital parking system is still rare to be found. In this research, indicators are not only taken from 1 main research that comes from identical field of research, instead, derived from several similar fields such as mobile banking, e-toll, and mobile apps. Although there are similarities in collaboration of transportation, financial, and technological aspect, those research fields also have its own characteristics and differences compared to digital parking system. Standardized loading value that falls below cut off proves

that not all measured variables from mobile banking, e-toll, and mobile apps in general can be adopted to analyze factor in digital parking system.

Moreover, combination of 2 or 3 different research is used to define measured variables within a factor. It is meant to avoid having less than 3 measured variables in the end of measurement model testing, as having at least 1 rejected measured variables appears in most research. For example, CI1 are taken from Gyampah & Salam (2004), while CI2, CI3, CI4, and CI5 are taken from Park, et al, (2012). In measurement model testing, each measured variable has intense interaction in each other, where a slight change in one measured variable's standardized error can change standardized loading of other measure variables. Some overlapping definition or different characteristic between measured variable that comes from different research may cause inability for those measured variable to be put together and some of them being rejected.

Rejected measured variable may not be solely caused by model misspecification, but can also be representation of real user behavior. In this case, user thinks that ability to afford pay internet package (PBC 5) and network stability (PBC 6) do not represent their condition in daily life. Currently, Indonesian network provider are competing on improving their network quality and maintain affordable price to win the market. It's getting easier for people to have internet access. Also, relatic problematic experience, such as poor network while making payment in mall, can be hardly encountered since parking activity is conducted on street where there is no building blocking the signal.

User also thinks that "information verification" (PS 3) is not relatable to them. This feature does not always appear in every mobile application, so that people only may have low awareness of it. Information verification is more likely to be included in user-friendliness or user convenience aspect.

Lastly, "presence of offline information media" to spread information about digital parking (CI 1) is not also relatable in user persperctive. Most of information now can be accessed and shared via internet, both in public social media or private messaging platform. Supporting the idea, standadized loading also show significant relation between online information media and communication & information factor.

Since there are some measured variables that do not meet first criteria of convergent validity, it is not necessary to do analysis of remaining 2 convergent validity parameters. The model has to be respecified first by removing measured variables that fall bellow cut off value. If all measured variables in the modified model has passed the standardized loading assessment, then it can be proceeded to AVE and CR analysis.

5.2.2 Modified Measurement Model

After all the rejected measured variables are removed from the model, firstly the new standardized loadings are analyzed. All measured variables in the modified model have passed 0.5 cut off value. Value of standardized loading also represents how significant a factor is explained by a set of measured variable. A measured variable that has highest standardized loading among other measure variables within a factor becomes variable that can best define the factor.

In perceived behavioral control, measured variable that has most correlation with the factor is "ability to install mobile application" (PBC 3) with standardized value of 0.87. In that sense, installation is the first step to use e-parking mobile application. By having the mobile application installed, user can have hands-on experience that allows user to learn more about operating the mobile application. Comes after that are knowledge and ability to operate mobile application by standardized loading and ownership of mobile phone.

In personal innovativeness, measured variable that has most correlation with the factor is "tendency to immediately try out new technology" (PI 1) with standardized value of 0.77. In fact, the difference in standardized loading value is not much different with "first one to try new technology" (PI 2) and "having previous experience with various type of technology (PI 3), that are 0.75 and 0.74 respectively. However, PI 1 can summarize other measured variables in representing personal innovativeness.

In perceived security, measured variable that has most correlation with the factor is "safe data storage" (PS 1) with standardized value of 0.86. Data safety become highly concerned issue nowadays, as data is growing into powerful decision-making support system. Technological advancement makes it so easy to

store and share personal data through internet. However, as internet are open space for everyone around the world, it also creates a hole of chance for data being stolen. Therefore, security management plays important role to maintain user's trust on a digital system. Ultimate point of "mechanism to address potential violation" (PS 2), "system owner credibility" (PS 4), and "e-wallet provider credibility" (PS 5) is also to achieve safe data storage and reliable digital system.

In relative advantage, measured variable that has most correlation with the factor is "good substitute" (RA 4) with standardized value of 0.82. User believes that for those new features served by digital parking system, digital parking system may address drawbacks of previous parking systems and become a good replacement for parking system in Sidoarjo Regency. Competitive advantage of digital parking system compared to previous parking system are represented by "convenience to use" as the whole system are designed to be more responsive to user needs (RA 1), "provide better price" as price in all parking space will be standardized (RA 2), and "conduct task more quickly" as it gives people chance to find check vacant parking space and make booking (RA 3).

In behavioral intention, measured variable that has most correlation with the factor is "plan to frequent use" (BI 3) with standardized value of 0.88. Rather than being curious for launching of mobile application and anticipating first time experience in using the of digital parking system, people are planning to be committed in using the system frequently. However, since users are not yet familiar with the system, they cannot always say the will use the system especially in the beginning of its implementation. There should be a transition where parking spaces that require use of digital parking system are expanded gradually, instead of being implemented in all on-street parking area of Sidoarjo at once.

Second parameter of convergent validity is AVE. AVE seeks to analyze how much a construct contain explained variation from its measured variable. It is calculated by averaging squared standardized loading from each measured variable under 1 construct. Starting from here, assessment will be done from perspective of a construct instead of a measured variable as in standardized loading analysis.

A construct must have AVE of 0.5 or higher. Table 4.14 shows that all constructs pass the AVE cut off value. It means that all sets of measured variable

are able to explain at least 50% variation incurred within their relationship with the factor. Variable that has highest score is behavioral intention with AVE of 0.7. Remaining variation are explained by relationships or variables outside the measurement model that are not yet defined. In the modification indices result, LISREL software suggests that there should be some path added between a factor and a measured variable that belongs to another factor. It will create multi-collinearity if the path is added to model. It is actually not allowed to exist in CFA model. So, in the end, the path is not (and should never be) added to the model. However, this suggestion indicates that there is multi-collinearity potential in the model which comes from high correlation between two constructs.

Third parameter of convergent validity is CR. CR measures internal consistency or how much a factor is consistently represented by the same measured variables. Two elements that are used in calculation of CR are standardized loading and standardized error of each measured variables. A construct must have CR of 0.7 or higher. Table 4.14 shows that all constructs pass the CR cut off value. Variable that has highest score is behavioral intention with CR of 0.96. This indicates that "anticipation to first time use" (BI 1), "plan to first time use" (BI 2), "plan to frequent use" (BI 3), "plan to constant use" (BI 4), and "tendency to recommend system to others" (BI 5) is consistent in explaining factor behavioral intention. The same applies to the other factors.

Another type of validity in measurement model testing is discriminant validity. Discriminant validity ensures that a factor is sufficiently different from other similar factor to be distinct. To be considered as discriminant valid, construct's AVE score must be greater than squared of its correlation with other constructs. According to calculation result on Table 4.15, all parameter has passed discriminant validity criteria, except relationship from relative advantage, which AVE is 0.53, and square correlation with behavioral intention is 0.67. Squared correlation bigger than AVE indicates that the correlated variables plays important role in explaining variance in the other variables (Price, et al., 2015). In the further analysis about total effect, it will be shown that relative advantage is variable that contributes most effect to behavioral intention. Indirectly, measured variables in relative advantage will also give explain behavioral intention.

5.2.3 Goodness of Fit Test

Goodness of fit test is conducted on modified measurement model to see if the whole model is able to produce a good fit. There are 7 parameters used in this research which represent goodness of fit (normed chi square), badness of fit (RMSEA and SRMR), incremental fit (NFI and NNFI/TLI), and parsimony fit (CFI and PNFI). A model is said to have a good fit when they pass at least 1 parameter in each fit category. Goodness of fit and badness of fit are part of absolute fit indices. It evaluates how well the specified model reproduces observed data independently without comparing to other possible models. Incremental fit estimates how well the model reproduces observed data in comparison to null model or model that assumes all measured variables are not correlated. It implies that no model specification could possibly improve the model, because the null model contains no multi-item factors or relationships between them (Hair, et al., 2014). Parsimony fit measures how well the model reproduces observed data relative to its complexity. The complexity itself is represented by total degree of freedom available.

Cut off value for each parameter are presented in Table 3.6. Actually, there are arguments between experts about which cut off value is the best to represent a good fit. To summarize all the opinion, Knight, et al (1994), as cited from Planning (2013), creates a guideline for interpreting a fit result. For most fit parameter that has scale of 0 to 1, value of above 0.9 is classified as good fit, 0.89 – 0.8 is marginal fit, 0.79 – 0.6 is bad fit, and below 0.6 is very good fit. Result from the calculation presented in Table 4.16 shows that model pass cut off value of all goodness of fit parameters. Despite having a low cut off value, PNFI has a slightly low score compared to value of other parameter. This will happen when a model has a large degree of freedom.

5.3 Structural Model Testing

Structural model testing consists of goodness of fit test, hypothesis testing, and effect composition. Before conducting structural model testing, value of each standardized loading should be analyzed. Despite having some correlation replaced

by hypothesized path, standardized loading should remain the same with the one in measurement model. It is because basically nothing in the relationship between a measured variable and factor changes. Changes only happen in the relationship among factors. From Figure 4.36 and Table 4.13, it can be seen that there is no difference of standardized loading between measured variable and its factor. Then, the analysis can be carried out to goodness of fit test result, hypothesis testing result, and effect composition result.

5.3.1 Goodness of Fit Test

Not much different with goodness of fit test for measurement model, goodness of fit test in structural model also use normed chi square, RMSEA, SRMR, NFI, NNFI, CFI, and PNFI. The cut off values used to assess model fit are also the same. As shown in Figure 4.36, structural model has met all required parameter of goodness of fit test. However, there are slight differences between goodness fit test result in measurement model and goodness of fit result in structural model. Normed chi square score decreases by 0.01 into 2.19. CFI and PNFI score also increases by 0.01 into 0.96 and 0.8 respectively. Decrease in normed chi square and increase in CFI and PNFI are sign of increased model performance.

Normed chi square can decrease when either degree of freedom decreases or degree of freedom increases. While adding path in structural model will free up some degree of freedom and deleting path will add degree of freedom, increase of degree of freedom is eliminated from the option. In structural model, correlation among factor that previously exist in measurement model will be set to 0 (Hair, et al., 2014). This will decrease chi square, thus also decrease normed chi square score. Similar concept also becomes reason of increasing CFI and NFI score. Since model complexity increases, degree of freedom will decrease. This will result in improving the model fit.

5.3.2 Hypothesis Testing

Hypotheses are developed based on theories from pre-existing research that state there is a positive influence from a factor to another factor. The theories come

from many sources which have different field of research and different object of research. Hypotheses should be tested to check if those theories can be applied to the case of digital parking system in Sidoarjo Regency. T-value is used as parameter to determine the hypothesis acceptance. With significance level of 0.05 for two tailed test, it is obtained that cut off t-value is 1.96. As shown in Table 4.18, 5 out of 7 hypotheses are accepted. Rejected hypotheses are H2 that states relationship from perceived behavioral control to behavioral intention and H6 that states relationship from communication and information to behavioral intention.

H1 : Relative advantage positively influences behavioral intention

This hypothesis is tested to check whether constructive differences between newly proposed digital parking system and conventional parking system increase willingness of people to shift to digital parking system. According to Park, et al. (2016), in the implementation of mobile learning platform, relative has highest direct effect on behavioral intention among other factors, which is 0.29. This effect is classified as large effect (Cohen, 1988). Although this hypothesis is adopted from existing research, hypothesis testing in SEM is case specific, meaning that the result will not be the same when it is applied to different field of research or different object of research. Thus, the hypothesis has to be retested to see if a relationship is significant. By knowing how significantly relative advantage does influence behavioral intention, Dinas Perhubungan Sidoarjo could put more time and budget in developing distinctive feature of digital parking system instead of trying to developing other aspect such as communication & information (public relation) and security of mobile application.

Result of hypothesis testing shows that, with t-value of 7.35, relative advantage does positively influence behavioral intention. It means that people will have more intention to use digital parking system when a distinctive advantage is added to the system. From user's suggestion, distinctive advantage can be manifested in form of feature in mobile application, such as vacant space information or booking feature, and also overall service quality improvement such more competent parking attendant. User also suggest that Dinas Perhubungan Sidoarjo take benchmarking to other city or region, that already implemented non-

conventional parking system such as Parking Meter, to make sure that not only the system proposes good features but also is implemented well in daily practices. Respondents also argue that convenience and easiness in usage should also be prioritized.

H2 : Perceived behavioral control positively influence behavioral intention

This hypothesis is tested to check whether enhancing ability and facility possessed or received by user will increase willingness of people to shift to digital parking system. According to Chen, et al. (2007), in the implementation of electronic toll collection, perceived behavioral control has highest direct effect on behavioral intention among other factors, which is 0.36. This effect is classified as large effect (Cohen, 1988). Although perceived behavioral control has been proven to have positive impact on behavioral intention in the pre-existing research, hypothesis testing in SEM is case specific, meaning that the result will not be the same when it is applied to different field of research or different object of research. Thus, the hypothesis has to be retested to see if a relationship is significant. If perceived behavioral control does influence behavioral intention, this implies that Dinas Perhubungan Sidoarjo could give more effort in supporting user ability and facility in using the digital parking system.

Result of hypothesis testing shows that, with t-value of -0.43, perceived behavioral control does not positively influence behavioral intention. It means that although someone does not have the required abilities and facilities to use in digital parking system, he may still have willingness or anticipation to use the parking system. It is also stated in Unified Theory of Acceptance and Use of Technology by Vankatesh (2003) that factor influenced by facilitating conditions (a factor of similar definition with perceived behavioral control) is actual usage of system, instead of user intention itself. It makes sense in this case since someone who doesn’t have a cellphone may have willingness in using digital parking system, but in the end, will not be able to participate in using the system.

H3 : Personal innovativeness positively influences perceived behavioral control

This hypothesis is tested to check whether an increase in personal innovativeness will increase willingness of people to shift to digital parking system. According to Jackson, et al. (2013), in the implementation of hospital information system, personal innovativeness has high direct effect on perceived behavioral control, which is 0.42. This effect is classified as large effect (Cohen, 1988). Although personal innovativeness has been proven to have positive impact on perceived behavioral control in the pre-existing research, hypothesis testing in SEM is case specific, meaning that the result will not be the same when it is applied to different field of research or different object of research. Thus, the hypothesis has to be retested to see if a relationship is significant. By knowing how much significant the relationship is in supporting behavioral intention, Dinas Perhubungan Sidoarjo may give stimulus to drive innovativeness such as reward system.

Result of hypothesis testing shows that, with t-value of 4.56, personal innovativeness does positively influence perceived behavioral control. In the beginning, it is assumed that knowledge and ability aspect in perceived behavioral control are determined by someone's initiative in learning new technology. With the hypothesis not rejected, it means that if someone has the willingness to learn about digital parking system, they will most likely be able to use it. Notes given by respondent are special considerations have to be taken when it comes to old people. Most of old people (above 50 years old) are perceived to have little ability and initiative on learning new technologies.

H4 : Personal innovativeness positively influences behavioral intention

This hypothesis is tested to check whether an increase in personal innovativeness will increase willingness of people to shift to digital parking system. According to Jackson, et al. (2013), in the implementation of hospital information system, personal innovativeness has high direct effect on behavioral intention, which is 0.36. This effect is classified as large effect (Cohen, 1988). Although personal innovativeness has proven to have positive impact on behavioral intention in the pre-existing research, hypothesis testing in SEM is case specific, meaning that the result will not be the same when it is applied to different field of research

or different object of research. Thus, the hypothesis has to be retested to see if a relationship is significant. By knowing how significantly personal innovativeness does influence behavioral intention, Dinas Perhubungan Sidoarjo could give stimulus to drive innovativeness such as reward system.

Result of hypothesis testing shows that, with t-value of 2.12, personal innovativeness does positively influence behavioral intention. Aside from having contribution on perceived behavioral control, personal innovativeness also has direct influence on behavioral intention. This implies that as someone has the initiative to learn about digital parking system, his intention to use the system will also grow. A study by Shahin & Zeinali (2010) also shows that there is a strong relationship between innovativeness and learning skill.

H5 : Perceived security positively influence behavioral intention

Security plays important role in implementation of digital systems as lack in security may result in monetary loss for company. According to Statista (2019), global monetary damage caused by cybercrime increases by around 38% per year from 2015 to 2019 and the amount of loss reaches $3,500,000,000 in 2019. In banking practices, potential losses from cyber-attack may range in around 9% of company's net income (International Monetary Fund, 2018). Security also is believed to have critical impact on brand reputation (Accenture, 2016). In addition, security issue may increase churn rate as 52% percent of customer would consider using service from another provider if the other provider gives better security (Varonis, 2020) . This hypothesis is tested to check whether improving security aspect of digital parking system will result in increase of intention to use the system. According to Lallmahamood (2007), in the implementation of e-commerce, perceived security has direct effect on behavioral intention of 0.244. This effect is classified as medium effect (Cohen, 1988). Although perceived security has proven to have positive impact on behavioral intention in the pre-existing research, hypothesis testing in SEM is case specific, meaning that the result will not be the same when it is applied to different field of research or different object of research. Thus, the hypothesis has to be retested to see if a relationship is significant. If perceived security does influence behavioral intention, this implies that Dinas

Perhubungan Sidoarjo could improve digital security aspect such as data storage protection, server maintenance, and mechanism to address violation, within digital parking system to gain user trust and increase user intention to use digital parking system.

Result of hypothesis testing shows that, with t-value of 2.1, perceived security does positively influence behavioral intention. Use of online platform for parking activity has 2 sides of blade. It gives easiness and convenience to user. However, it can also be harmful if data storage is not managed carefully. The more secured digital parking system is designed, the more people willing to use the system. Some respondents also give note that security should be one prioritized aspect in the design of digital parking system. Some other respondents also propose additional feature related to security such as vehicle insurance to be included in the digital parking system.

H6 : Communication and information positively influence behavioral intention

According to Project Management Institute (2013), 1 out 5 projects fails because of ineffective communication, indicating that communication plays an important role within project implementation. This hypothesis is tested to check whether improving public relation aspect in term of communication and information in digital parking system will increase user's willingness to shift from conventional to digital parking system. According to Yang, et al. (2020), in the implementation of green product purchase, communication & information has effect on behavioral intention factors for about 0.4. This effect is classified as large effect (Cohen, 1988). Although communication & information has been proven to have positive impact on behavioral intention in the pre-existing research, hypothesis testing in SEM is case specific, meaning that the result will not be the same when it is applied to different field of research or different object of research. Thus, the hypothesis has to be retested. If communication& information does influence perceived behavioral control, Dinas Perhubungan Sidoarjo could give more information and use more effective platform in order to increase user's willingness to adopt the system.

Result of hypothesis testing shows that, with t-value of 0.81, communication and information does not positively influence behavioral intention. There is not enough evidence to say that the relationship is significant. In some other researches, instead of having direct relationship to behavioral intention, communication and information are directed to other mediating factor first (Gyampah & Salam, 2004) (Maichum, et al., 2016). Hypothesis about relationship between communication and information with perceived behavioral control are accepted, meaning that communication and information can have relationship to the ultimate factor of interest, instead, through another factor. From the critic and suggestion section, some customers show sceptic opinions about the implementation of digital parking system in Sidoarjo Regency. This is caused by only little information they have previously received about digital parking system.

H7 : Communication and information positively influence perceived behavioral control

According to Project Management Institute (2013), 1 out 5 projects fails because of ineffective communication, indicating that communication plays an important role within project implementation. This hypothesis is tested to check whether improving public relation aspect in term of communication and information in digital parking system will boost knowledge and ability of people in using digital parking system. According to Maichum, et al. (2016), in the implementation of energy saving technology, communication & information has effect on perceived behavioral control factor for about 0.35. This effect is classified as large effect (Cohen, 1988). Although communication & information has been proven to have positive impact on perceived behavioral control in the pre-existing research, hypothesis testing in SEM is case specific, meaning that the result will not be the same when it is applied to different field of research or different object of research. Thus, the hypothesis has to be retested. If communication& information does influence perceived behavioral control, Dinas Perhubungan Sidoarjo could give more information and use more effective platform to broaden user's knowledge and boost their skill in using digital systems.

Result of hypothesis testing shows that, with t-value of 4.65, communication and information does positively influence perceived behavioral control. In this sense, it can be interpreted that communication and information provided about digital parking system will support the knowledge and ability someone has in using the system. A study by Shao & Purpur (2016) also shows that amount of information provided will influence ability.

5.3.3 Effect Composition

T-value is calculated to know whether a path has significant relationship. However, no conclusion about effect of interrelated factor can be drawn from there. Effect composition is done to know which factor has the most contribution to behavioral intention. Total effect is obtained by adding direct and indirect effect of a path. Indirect effect occurs when there is at least 1 mediating factor between origin factor and designated factor. In the model, only path from personal innovativeness to behavioral intention and from communication and information to behavioral intention that has indirect effect. Path effect is calculated based on loading estimates.

In Table 4.19, result of effect calculation is presented. Variable that has largest effect on behavioral control is relative advantage, followed by perceived security, personal innovativeness, and communication and information respectively. In here it can be seen that, although H6 does not represent significant relationship between communication and information and behavioral intention, they still have slight effect on each other.

According to Cohen (1988) as cited in Preacher & Kelley (2011), effect can be classified into small, medium, and large by effect value of 0.01 - 0.09, 0.1 – 0.25 and > 0.25. Based on the classification, relative advantage will have large effect on behavioral intention. Measured variable that has highest contribution in defining relative advantages are perception of good substitute (RA 4) and convenience to use (RA 1). This goes along with suggestion from respondent that are mostly about request for service improvement and convenience to use. Creating user friendly interface and simplifying usage procedure can improve easiness to use (Zhou, 2011). Then, improved interface should be assessed using Usability Testing

to check if there are some difficulties in operating the mobile application. Some simplification that can be made to simplify the parking process is by including type of vehicle used in user profile. That way, user will not have to pick type of vehicle in every parking occasion, instead only in the first time. If a user has more than 1 vehicle he usually used, an option to change vehicle should be appear in the next page.

Meanwhile, perceived security and personal innovativeness will have medium effect on behavioral intention. Security is an important issue in digital system. Measured variables that have highest contribution in explaining perceived security are safe (PS 1) data storage and mechanism to address violation (PS 2). A framework such as, MASF, could be implemented to boost security of mobile app (Hussain, et al., 2018). Encryption can also be done to avoid data and information being stolen. Several respondents also state that vehicle insurance should be added in the new system as a part of security aspect.

Personal innovativeness also gives a moderate influence on behavioral intention. Measured variable that has highest contribution in explaining personal innovativeness is willingness to put effort in learning new technology (PI 5). Since willingness to learn is something that comes from inner part of a person, user may not be aware of the trait itself. Personal innovativeness and willingness to learn can be improved through social influence (Lu, 2014). Also, according to Lu (2014), the social influence can be manifested in form of brand ambassador and word of mouth. Sidoarjo Regency Government can hire a well-known public figure in Sidoarjo to promote the digital parking system and raise people's willingness to learn using the system.

Lastly, communication and information will have small effect on behavioral intention. Measured variables that have highest contribution in explaining communication and information are sufficient amount of information (CI 3) and up-to-date information (CI 4). Previously, information about the proposal of digital parking system has been published but only on several occasion. In the future, news and updates about digital parking system should be continuously distributed to user. Instead of only distributing through news, the information can also be spread through Sidoarjo's regency social media, that is able to reach more than 38 thousand

people. Small effect is caused by the calculation of total effect from communication and information to behavioral intention receives negative value from perceived behavioral control to behavioral intention relationship. Since the effect is small and the hypothesis testing also proves the insignificance, presence of communication and information and does not really make much difference on behavioral intention.

Perceive behavioral control has negative effect on behavioral intention. Negative value itself means there is a small possibility that people will not be anticipating to use digital parking system anymore if they already know well about how to operate the system and there is no other intervention from external variables. However, since the effect is small and the hypothesis testing also proves the insignificance, presence of perceived behavioral control does not really make much difference on behavioral intention.

CHAPTER 6
CONCLUSION AND RECOMMENDATION

This chapter will give explanation about conclusion and suggestion based on data processing and analysis result.

6.1 Conclusion

According to research findings and analysis that has been conducted, conclusion that can be drawn are:

1. This research tries to confirm factors that have influence on behavioral intention to adopt digital parking system based on findings from previous research of similar research field. Factors used in this research are perceived behavioral control, personal innovativeness, perceived security, communication and information, relative advantage, and behavioral intention. There are 7 hypotheses that are trying to be developed in this research to represent relationship among the factors. Result of hypothesis testing shows that relative advantage (H1), personal innovativeness (H3), and perceived security (H5) have significant influence on behavioral intention. In addition, personal innovativeness (H4) and communication and information (H7) also have significant positive influence on perceived behavioral control. Meanwhile, the rejected hypotheses are relationship from perceived behavioral control to behavioral intention (H2) and from communication and information to behavioral intention (H6).
2. Sidoarjo Regency Government should priorities relative advantage in the first place while creating improvement for digital parking system, as relative advantage holds strongest impact on behavioral intention among the other variable. The rank of priority continues to perceived security and personal innovativeness. Communication and information also has small positive effect on behavioral intention. Meanwhile, perceived behavioral control has very small negative effect on behavioral. However, since the effect is small and trivial, it does not make any difference on behavioral intention.

6.2 Recommendation

There are some recommendations that can be made in order to improve future research related to digital parking system, which are:

1. Larger sample size, at least 10 samples per 1 measured variable, can be used for future research. This will allow exploration in estimation method used in generating covariance matrix of sample data. Also, larger sample size will have more advantage in addressing non-normal data.
2. Before designing questionnaire, it will be better to create what-if and root cause analysis of every possible outcome of the model testing. Then, root cause variable that is already found, as a variable that is not included in the model, can be added to the questionnaire to capture insight about effect of external variables on variables or relationship within the model.

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APPENDIX

Appendix 1. Google Form Questionnaire

Survey Penerimaan Penguna Terhadap Sistem Digital Parking Kabupaten Sidoarjo

Terima kasih atas kesediaannya untuk mengisi survey ini. Perkenalkan, saya Saskia Putri Kamala, mahasiswi Teknik Industri Institut Teknologi Sepuluh Nopember (ITS).

Pemerintah Kota Sidoarjo sedang merancang sistem parkir baru berdasarkan mobile application untuk area parkir luar gedung atau on-street parking. Dalam perancangannya perlu dilibatkan perspektif pengguna sistem. Survey ini dibuat untuk keperluan Tugas Akhir / Skripsi saya mengenai aspek yang mempengaruhi penerimaan pengguna terhadap sistem parkir baru yang sedang dicanangkan oleh Pemerintah Kabupaten Sidoarjo.

Identitas dan jawaban dari responden hanya akan digunakan untuk kebutuhan Tugas Akhir saya dan akan dijaga kerahasiaannya. Jika ada pertanyaan, silahkan hubungi saya melalui email saskia16@mhs.ie.its.ac.id. Terima kasih.

* Required

Nama *

Your answer

Usia *

- ◯ < 24 tahun
- ◯ 24 - 39 tahun
- ◯ 40 - 55 tahun
- ◯ > 55 tahun

Tipe Kendaraan Yang Biasa Digunakan *

- [ ] Motor
- [ ] Mobil
- [ ] Other:

Apakah sebelum ini Anda pernah mendengar kabar bahwa Pemerintah Kabupaten Sidoarjo berencana menerapkan sistem digital parking? *

- ◯ Sudah pernah
- ◯ Belum pernah

Next

Survey Penerimaan Penguna Terhadap Sistem Digital Parking Kabupaten Sidoarjo

Informasi Dasar Sistem Parkir Digital

Rancangan Sistem Parkir Digital Kabupaten Sidoarjo

Back Next

Survey Penerimaan Penguna Terhadap Sistem Digital Parking Kabupaten Sidoarjo

* Required

Respon Pengguna terhadap Rancangan Sistem Parkir Digital

Keterangan
1 = Sangat amat tidak setuju
2 = Sangat tidak setuju
3 = Tidak setuju
4 = Setuju
5 = Sangat setuju
6 = Sangat amat setuju

Perceived Behavioral Control

Pertanyaan mengenai Perceived Behavioral Control mengukur akses ke sumber daya dan peluang yang diperlukan untuk melakukan suatu perilaku

Saya memiliki handphone yang dapat digunakan untuk menjalankan aplikasi D-parking *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya memiliki kemampuan dan waktu untuk menginstall aplikasi baru pada handphone saya *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya memiliki pengetahuan mengenai cara mengoperasikan sebagian besar aplikasi pada handphone saya *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya memiliki kemampuan untuk mengoperasikan sebagian besar aplikasi pada handphone saya *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya mampu membeli paket data untuk handphone saya *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Sinyal pada handphone saya stabil *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Personal Innovativeness

Pertanyaan mengenai Personal Innovativeness mengukur kesediaan seseorang untuk mencoba teknologi informasi baru

Saya senang mencoba perangkat teknologi/aplikasi seluler baru *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya selalu menjadi yang pertama dalam mencoba perangkat teknologi/aplikasi seluler baru di antara orang-orang di sekitar saya *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya pernah menggunakan beragam jenis perangkat teknologi/aplikasi seluler *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya tidak ragu untuk menggunakan sebuah perangkat teknologi/aplikasi seluler *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya memiliki keinginan untuk mempelajari perangkat teknologi/aplikasi seluler *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Security Perception

Pertanyaan mengenai Security Perception mengukur persepsi tentang tingkat perlindungan yang diberikan pada saat melakukan suatu perilaku

Saya percaya bahwa aplikasi D-parking akan memiliki sistem pengamanan data yang baik *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya percaya bahwa aplikasi aplikasi D-parking akan memiliki mekanisme respon untuk penanggulangan kebobolan sistem *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya berhak untuk meninjau kembali informasi yang akan disimpan sebelum melanjutkan ke halaman selanjutnya *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya percaya bahwa e-wallet merupakan media pembayaran yang aman *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya percaya bahwa Pemerintah Kabupaten Sidoarjo merupakan badan yang terpercaya untuk mengelola dan menyimpan informasi *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Back Next

Survey Penerimaan Penguna Terhadap Sistem Digital Parking Kabupaten Sidoarjo

* Required

Respon Pengguna terhadap Rancangan Sistem Parkir Digital

Keterangan
1 = Sangat amat tidak setuju
2 = Sangat tidak setuju
3 = Tidak setuju
4 = Setuju
5 = Sangat setuju
6 = Sangat amat setuju

Communication & Information

Pertanyaan mengenai Communication & Information mengukur sejauh mana seseorang percaya bahwa menggunakan media tertentu akan membantunya mengkomunikasikan informasi dengan jelas atau memahami informasi secara akurat dan persepsi efisiensi komunikasi

Media penyebaran offline (contoh : demonstrasi/ peragaan langsung dan media cetak) akan membantu saya untuk lebih mengerti tata cara penggunaan aplikasi parkir *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Media penyebaran online (contoh : media sosial, email, website posting) akan membantu saya untuk lebih mengerti tata cara penggunaan aplikasi parkir *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya berhak mendapatkan informasi yang memadai mengenai aplikasi D-parking *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya berhak mendapatkan informasi terbaru mengenai aplikasi D-parking *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya percaya bahwa penyebaran informasi mengenai aplikasi D-parking akan menggunakan bahasa yang mudah dimengerti orang awam *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Relative Advantage

Pertanyaan mengenai Relative Advantage mengukur sejauh mana inovasi dianggap lebih baik daripada ide yang digantikannya

Saya percaya bahwa sistem parkir digital membuat proses parkir lebih mudah dibandingkan sistem parkir karcis dan sistem parkir berlangganan *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya percaya bahwa sistem parkir digital dapat memberikan tarif yang terstandarisasi karena menggunakan sistem aplikasi resmi dari pemerintah *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya percaya bahwa informasi mengenai slot parkir kosong dapat membuat proses mencari parkir lebih cepat *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya percaya bahwa sistem parkir digital merupakan pengganti yang baik untuk sistem parkir karcis dan sistem parkir berlangganan *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Behavioral Intention

Pertanyaan mengenai Behavioral Intention mengukur kekuatan niat seseorang untuk melakukan perilaku tertentu

Saya menantikan penerapan sistem parkir digital *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Apabila sudah rilis, saya berencana mencoba sistem parkir digital *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Apabila sudah rilis, saya berencana sering menggunakan sistem parkir digital *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Apabila sudah rilis, saya berencana selalu menggunakan sistem parkir digital *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Saya berencana merekomendasikan sistem parkir digital kepada orang-orang di sekitar saya *

	1	2	3	4	5	6	
Sangat tidak setuju	○	○	○	○	○	○	Sangat setuju

Masukan dan Saran untuk Rancangan Sistem Parkir Digital Kabupaten Sidoarjo

Your answer

Back Submit

Appendix 2. Recapitulation of SEM Questionnaire

PBC1	PBC2	PBC3	PBC4	PBC5	PBC6	PI1	PI2	PI3	PI4	PI5	PS1	PS2	PS3	PS4	PS5
6	6	6	6	4	4	4	2	3	6	4	4	5	6	5	5
6	5	5	5	5	5	6	4	5	5	5	4	3	5	4	4
5	5	5	5	5	4	4	3	4	4	4	4	4	4	5	4
6	6	6	6	6	6	5	4	5	6	6	4	4	4	6	4
5	5	5	4	6	6	3	2	2	2	3	4	4	4	5	2
6	6	5	5	6	4	3	3	3	4	3	5	5	5	4	4
5	4	5	5	5	5	5	3	4	4	4	4	4	4	4	4
5	5	5	5	5	4	6	5	4	5	5	5	6	5	6	5
6	6	6	6	6	6	5	6	5	4	5	6	5	5	3	5
6	6	6	5	5	5	6	4	4	5	5	4	4	6	4	5
6	6	6	6	5	5	5	4	5	6	4	5	4	6	5	4
5	5	6	5	5	4	4	3	4	4	5	4	5	5	4	3
5	5	4	5	5	4	3	3	2	2	3	4	4	3	1	2
6	6	6	6	5	6	4	3	4	3	4	4	3	4	3	4
5	5	6	6	6	5	5	5	5	4	5	3	3	6	4	4
6	6	6	6	6	5	5	4	5	4	4	5	5	5	6	4
6	6	5	5	5	5	5	4	5	5	6	5	5	5	4	5
6	6	6	6	6	4	3	2	4	5	4	5	5	4	4	5
6	6	6	6	6	6	6	2	5	6	6	5	5	5	2	6
6	6	6	6	4	4	6	4	3	6	6	6	6	6	6	3
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6
6	6	6	6	6	4	5	5	5	5	6	5	4	6	4	6
5	5	6	5	6	3	3	3	4	4	4	4	5	5	3	3
6	5	5	5	3	5	5	5	5	5	6	5	3	5	4	2
5	6	6	6	5	4	5	5	6	5	4	6	4	6	6	6
5	5	6	4	5	5	5	6	5	5	5	6	4	6	6	5
6	6	6	6	6	5	5	5	6	6	4	6	5	6	6	5
6	6	6	5	5	5	5	5	5	5	6	5	5	5	6	5
5	5	4	5	5	5	4	4	5	5	4	5	4	4	5	5
6	6	6	6	6	5	5	4	6	5	6	5	5	6	5	4
6	5	6	6	6	5	6	5	6	6	6	4	6	6	6	6
6	6	4	4	6	4	6	4	4	4	5	6	6	6	6	4
4	2	2	3	5	4	2	1	2	3	3	5	5	5	5	5
5	5	5	5	5	6	5	3	4	5	4	4	5	6	5	2
6	6	6	6	6	6	6	6	6	6	6	4	3	6	5	3
5	5	5	5	5	5	4	3	4	4	4	4	4	4	4	5
6	6	5	5	6	4	5	4	6	4	5	4	4	6	5	4
6	6	4	6	6	6	5	3	4	2	3	3	3	6	6	4

PBC1	PBC2	PBC3	PBC4	PBC5	PBC6	PI1	PI2	PI3	PI4	PI5	PS1	PS2	PS3	PS4	PS5
6	6	6	6	5	5	5	4	4	5	5	4	4	5	5	5
5	5	4	4	5	5	5	3	5	2	4	4	4	5	5	3
6	6	6	6	1	6	6	1	6	6	6	6	6	6	6	1
4	3	5	5	5	2	3	1	1	2	4	2	1	6	4	2
6	6	6	6	2	4	2	3	6	6	6	5	2	6	6	3
6	6	5	5	3	2	4	4	4	5	6	4	5	6	5	5
5	5	5	5	5	4	4	3	3	5	4	4	3	5	4	4
5	5	5	6	5	5	3	2	5	3	4	3	3	5	5	5
6	6	6	6	1	4	6	4	5	5	6	4	4	6	5	1
6	6	6	6	6	4	5	5	6	6	6	4	2	4	5	6
6	6	6	6	6	6	6	6	6	1	6	3	4	4	3	5
6	5	6	6	6	6	5	5	6	5	5	4	4	5	6	5
6	6	6	6	6	5	5	2	6	4	5	5	5	6	6	6
5	5	4	4	5	5	4	3	5	5	5	5	5	5	5	4
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
6	6	6	5	5	4	3	3	6	6	4	4	4	6	4	4
6	6	6	6	6	6	3	3	3	6	6	6	4	6	6	6
6	6	6	6	4	6	3	1	3	4	2	3	5	6	4	2
5	3	5	5	4	4	4	3	4	4	4	3	3	5	4	2
6	6	6	6	6	6	6	6	6	6	6	4	4	5	6	5
4	4	5	6	5	4	4	3	2	4	4	2	2	5	4	2
6	6	6	6	6	6	6	6	4	6	6	3	4	6	4	2
6	6	6	6	6	6	3	4	5	2	4	1	1	6	1	2
6	6	6	6	6	6	5	3	5	6	6	4	4	4	5	5
5	5	5	5	5	5	4	2	2	3	3	3	3	3	4	3
6	6	3	4	6	6	1	1	1	2	2	5	4	3	4	4
6	6	5	5	5	5	5	3	4	5	5	4	4	4	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
5	5	5	5	5	5	3	3	3	5	3	5	5	5	5	3
6	6	6	6	6	5	5	4	4	4	5	3	4	6	5	5
6	6	6	6	6	4	6	5	5	5	5	5	5	5	5	5
5	5	5	5	5	4	6	3	4	4	4	5	5	5	4	5
6	4	4	4	4	5	5	2	5	5	5	5	5	5	4	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
6	6	6	6	6	6	6	5	6	6	6	4	4	6	4	4
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
6	6	6	6	6	6	5	5	6	6	6	4	3	4	3	4
4	4	4	4	4	3	3	2	2	4	3	3	3	3	3	3
4	3	3	5	6	6	4	3	4	5	5	4	3	3	4	3
6	6	5	5	6	3	6	3	6	6	5	6	6	6	4	6

PBC1	PBC2	PBC3	PBC4	PBC5	PBC6	PI1	PI2	PI3	PI4	PI5	PS1	PS2	PS3	PS4	PS5
6	6	6	6	3	3	3	4	4	5	6	6	4	5	5	4
6	5	6	6	2	6	6	2	4	6	6	3	4	6	2	3
5	5	5	5	5	5	5	3	5	2	5	6	4	6	5	6
6	6	6	6	6	6	6	5	4	5	4	4	4	4	4	3
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PBC1	PBC2	PBC3	PBC4	PBC5	PBC6	PI1	PI2	PI3	PI4	PI5	PS1	PS2	PS3	PS4	PS5
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PBC1	PBC2	PBC3	PBC4	PBC5	PBC6	PI1	PI2	PI3	PI4	PI5	PS1	PS2	PS3	PS4	PS5
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CI1	CI2	CI3	CI4	CI5	RA1	RA2	RA3	RA4	BI1	BI2	BI3	BI4	BI5
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CI 1	CI 2	CI 3	CI 4	CI 5	RA 1	RA 2	RA 3	RA 4	BI 1	BI 2	BI 3	BI 4	BI 5
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CI 1	CI 2	CI 3	CI 4	CI 5	RA 1	RA 2	RA 3	RA 4	BI 1	BI 2	BI 3	BI 4	BI 5
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CI 1	CI 2	CI 3	CI 4	CI 5	RA 1	RA 2	RA 3	RA 4	BI 1	BI 2	BI 3	BI 4	BI 5
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CI 1	CI 2	CI 3	CI 4	CI 5	RA 1	RA 2	RA 3	RA 4	BI 1	BI 2	BI 3	BI 4	BI 5
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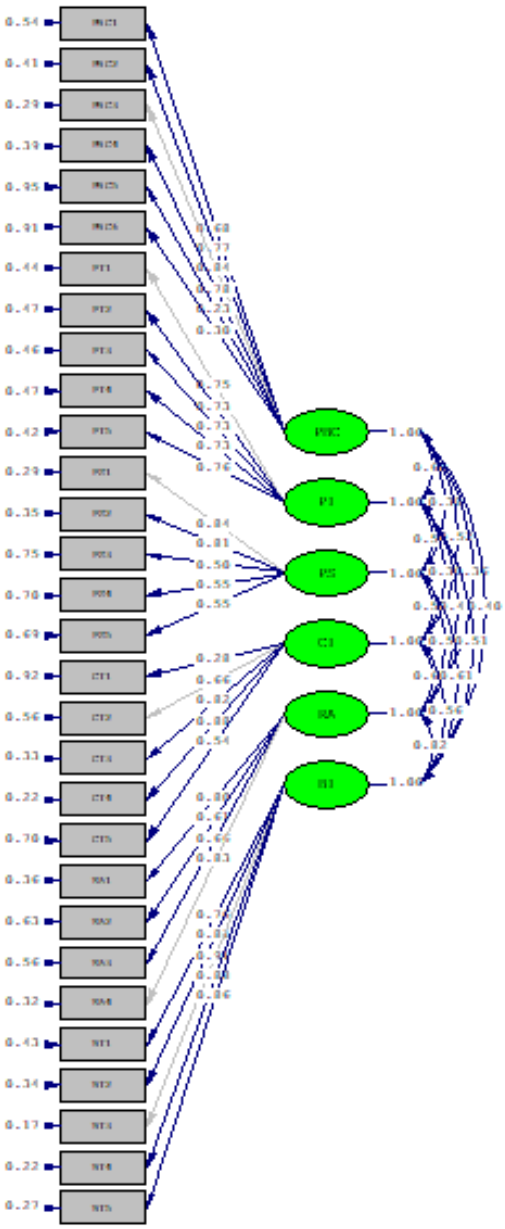
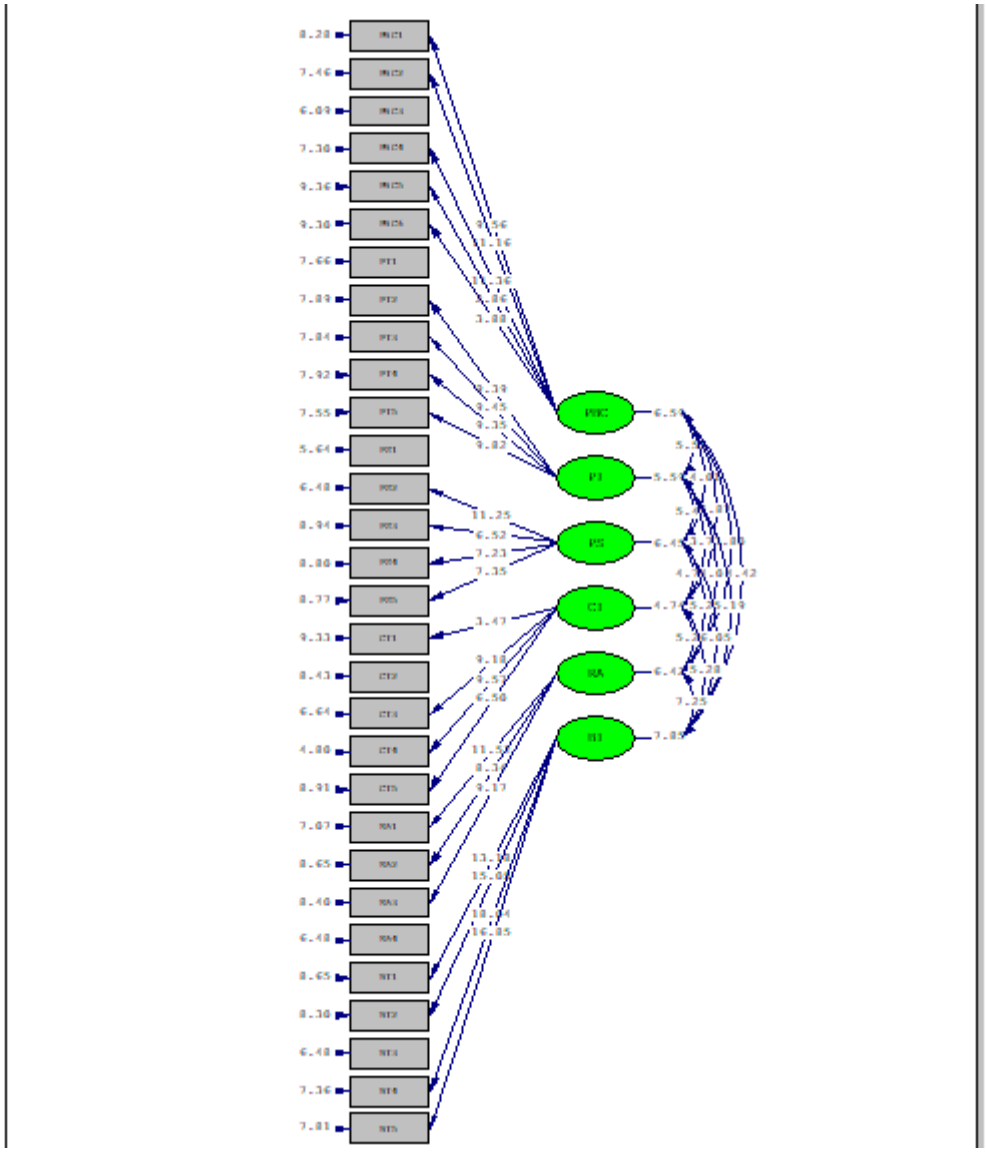
4	5	6	6	5	5	5	5	4	4	4	4	4	4
5	5	4	6	6	4	4	3	3	4	4	4	4	4
5	4	3	4	5	5	5	4	4	4	4	4	2	5
6	4	6	5	4	6	6	5	5	5	5	5	5	5
6	6	3	4	5	6	4	5	6	5	5	5	5	5
5	5	3	4	4	5	4	4	4	4	4	4	4	4
3	4	4	3	4	4	3	3	3	3	5	4	4	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6
5	6	6	6	6	5	6	6	6	5	5	4	4	4
5	5	5	5	5	5	5	4	5	5	5	4	4	4
2	5	6	6	4	4	5	4	5	5	4	5	5	4
4	4	4	4	4	4	4	4	4	4	4	4	4	4
6	6	6	6	4	3	6	6	3	5	6	5	5	6
5	5	4	6	6	4	4	3	3	4	4	4	4	4
5	6	6	6	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6
4	6	6	6	6	6	2	6	6	6	6	6	6	3
3	5	6	5	4	4	4	5	4	4	4	4	4	4

CI 1	CI 2	CI 3	CI 4	CI 5	RA 1	RA 2	RA 3	RA 4	BI 1	BI 2	BI 3	BI 4	BI 5
4	6	6	6	4	5	6	4	5	5	6	5	5	5
6	6	6	6	5	6	5	6	6	6	6	6	6	6

Appendix 3. Standardized Loading of Initial Measurement Model



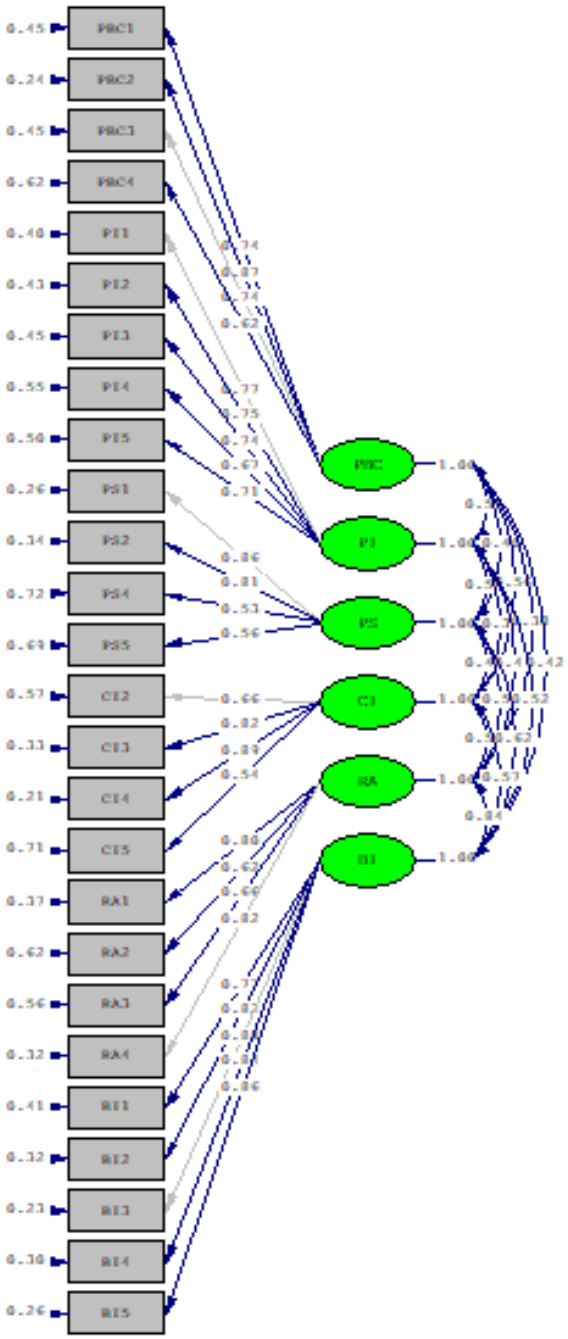
Appendix 4. T-value of Initial Measurement Model



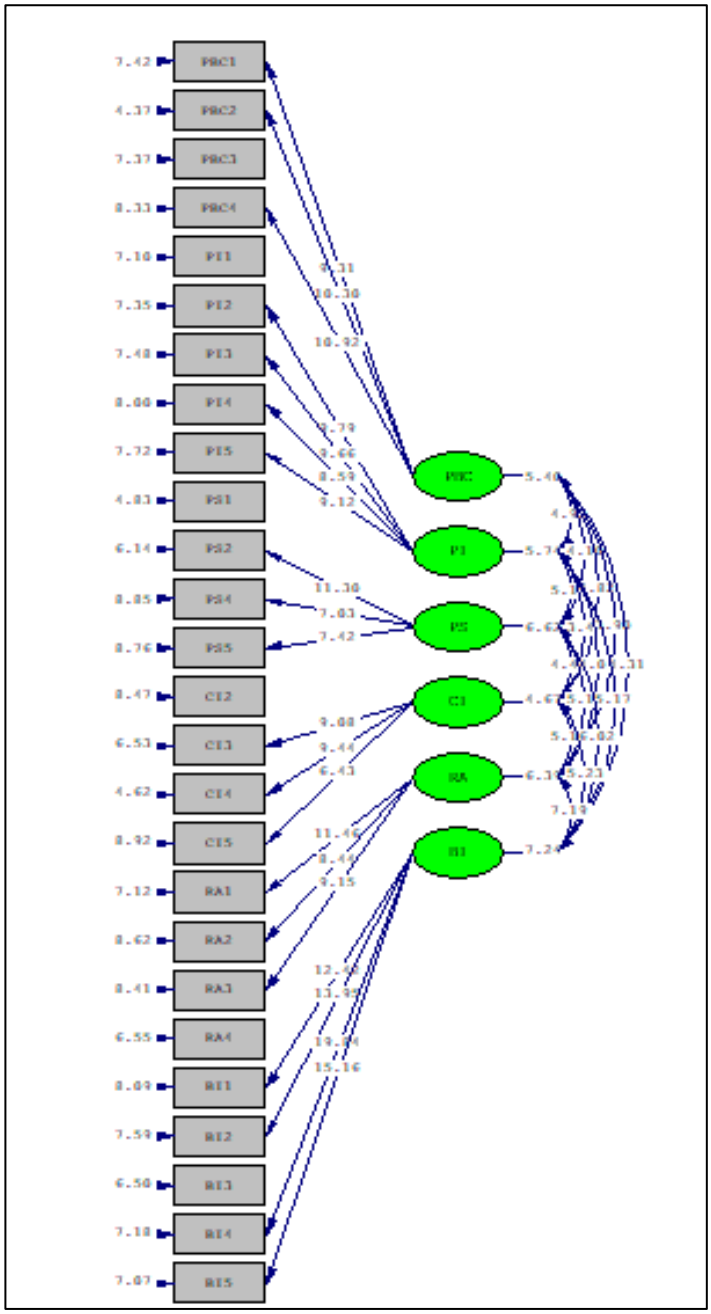
Appendix 5. GOF Test Result of Initial Measurement Model

Degrees of Freedom = 390
Minimum Fit Function Chi-Square = 1047.44 (P = 0.0)
Normal Theory Weighted Least Squares Chi-Square = 1081.15 (P = 0.0)
Estimated Non-centrality Parameter (NCP) = 691.15
90 Percent Confidence Interval for NCP = (597.00 ; 792.93)
Minimum Fit Function Value = 5.88
Population Discrepancy Function Value (F0) = 3.88
90 Percent Confidence Interval for F0 = (3.35 ; 4.45)
Root Mean Square Error of Approximation (RMSEA) = 0.100
90 Percent Confidence Interval for RMSEA = (0.093 ; 0.11)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.00
Expected Cross-Validation Index (ECVI) = 6.92
90 Percent Confidence Interval for ECVI = (6.39 ; 7.49)
ECVI for Saturated Model = 5.22
ECVI for Independence Model = 52.76
Chi-Square for Independence Model with 435 Degrees of Freedom = 9331.72
Independence AIC = 9391.72
Model AIC = 1231.15
Saturated AIC = 930.00
Independence CAIC = 9517.34
Model CAIC = 1545.20
Saturated CAIC = 2877.13
Normed Fit Index (NFI) = 0.89
Non-Normed Fit Index (NNFI) = 0.92
Parsimony Normed Fit Index (PNFI) = 0.80
Comparative Fit Index (CFI) = 0.93
Incremental Fit Index (IFI) = 0.93
Relative Fit Index (RFI) = 0.87
Critical N (CN) = 78.81
Root Mean Square Residual (RMR) = 0.10
Standardized RMR = 0.094
Goodness of Fit Index (GFI) = 0.71
Adjusted Goodness of Fit Index (AGFI) = 0.66
Parsimony Goodness of Fit Index (PGFI) = 0.60

Appendix 6. Standardized Loading of Modified Measurement Model



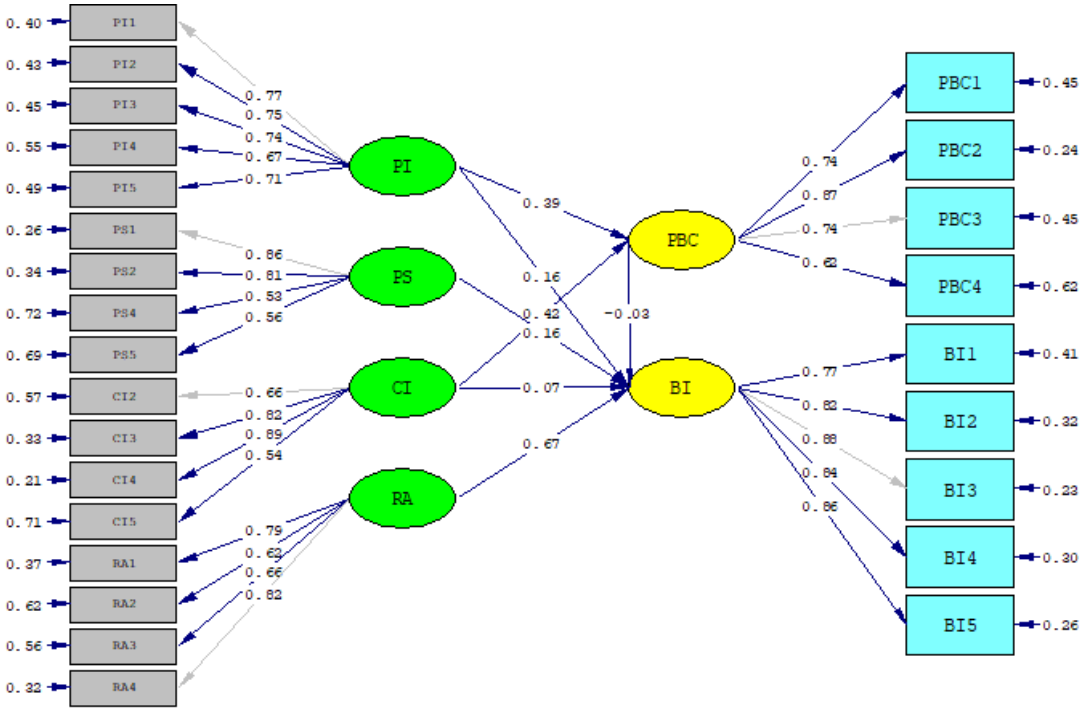
Appendix 7. T-value of Modified Measurement Model



Appendix 8. GOF Test Result of Modified Measurement Model

Degrees of Freedom = 280
Minimum Fit Function Chi-Square = 631.08 (P = 0.0)
Normal Theory Weighted Least Squares Chi-Square = 616.46 (P = 0.0)
Estimated Non-centrality Parameter (NCP) = 336.46
90 Percent Confidence Interval for NCP = (268.48 ; 412.17)
Minimum Fit Function Value = 3.55
Population Discrepancy Function Value (F0) = 1.89
90 Percent Confidence Interval for F0 = (1.51 ; 2.32)
Root Mean Square Error of Approximation (RMSEA) = 0.082
90 Percent Confidence Interval for RMSEA = (0.073 ; 0.091)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.00
Expected Cross-Validation Index (ECVI) = 4.26
90 Percent Confidence Interval for ECVI = (3.88 ; 4.69)
ECVI for Saturated Model = 3.94
ECVI for Independence Model = 45.88
Chi-Square for Independence Model with 325 Degrees of Freedom = 8114.37
Independence AIC = 8166.37
Model AIC = 758.46
Saturated AIC = 702.00
Independence CAIC = 8275.24
Model CAIC = 1055.76
Saturated CAIC = 2171.77
Normed Fit Index (NFI) = 0.92
Non-Normed Fit Index (NNFI) = 0.95
Parsimony Normed Fit Index (PNFI) = 0.79
Comparative Fit Index (CFI) = 0.95
Incremental Fit Index (IFI) = 0.96
Relative Fit Index (RFI) = 0.91
Critical N (CN) = 96.33
Root Mean Square Residual (RMR) = 0.085
Standardized RMR = 0.076
Goodness of Fit Index (GFI) = 0.79
Adjusted Goodness of Fit Index (AGFI) = 0.74
Parsimony Goodness of Fit Index (PGFI) = 0.63

Appendix 9. Standardized Loading of Structural Model



Appendix 10. GOF Test Result of Structural Model

Degrees of Freedom = 282
Minimum Fit Function Chi-Square = 631.24 (P = 0.0)
Normal Theory Weighted Least Squares Chi-Square = 617.08 (P = 0.0)
Estimated Non-centrality Parameter (NCP) = 335.08
90 Percent Confidence Interval for NCP = (267.14 ; 410.77)
Minimum Fit Function Value = 3.55
Population Discrepancy Function Value (F0) = 1.88
90 Percent Confidence Interval for F0 = (1.50 ; 2.31)
Root Mean Square Error of Approximation (RMSEA) = 0.082
90 Percent Confidence Interval for RMSEA = (0.073 ; 0.090)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.00
Expected Cross-Validation Index (ECVI) = 4.24
90 Percent Confidence Interval for ECVI = (3.86 ; 4.67)
ECVI for Saturated Model = 3.94
ECVI for Independence Model = 45.88
Chi-Square for Independence Model with 325 Degrees of Freedom = 8114.37
Independence AIC = 8166.37
Model AIC = 755.08
Saturated AIC = 702.00
Independence CAIC = 8275.24
Model CAIC = 1044.01
Saturated CAIC = 2171.77
Normed Fit Index (NFI) = 0.92
Non-Normed Fit Index (NNFI) = 0.95
Parsimony Normed Fit Index (PNFI) = 0.80
Comparative Fit Index (CFI) = 0.96
Incremental Fit Index (IFI) = 0.96
Relative Fit Index (RFI) = 0.91
Critical N (CN) = 96.92
Root Mean Square Residual (RMR) = 0.084
Standardized RMR = 0.076
Goodness of Fit Index (GFI) = 0.79
Adjusted Goodness of Fit Index (AGFI) = 0.74
Parsimony Goodness of Fit Index (PGFI) = 0.63

BIOGRAPHY

Author of this research is Saskia Putri Kamala. She was born in Jakarta, February 26th 1998. Her formal education starts by attending SD Islam At-Taqwa, SMP Negeri 216, SMA Negeri 21 Jakarta before pursuing her bachelor degree of Industrial Engineering in Institut Teknologi Sepuluh Nopember enrolled as class of 2016. She shows interest in organizational activities as she joined Himpunan Mahasiswa Teknik Industri ITS (HMTI ITS) as staff in Department of Community Development during 2017 to 2018. For her passion and performance in the organization, she was appointed as Secretary of HMTI ITS for period of 2018 to 2019 who was responsible to coordinate all project's administration in the organization. She was also active in Pemandu ITS as managerial trainer for self-management training in faculty level and event management training in department level. To increase skill and knowledge in professional level, she had internship in PT. Pertamina Gas as Project Management Intern. She was also involved in projects of Dinas Kebersihan dan Taman Terbuka Hijau Kota Surabaya as freelance researcher for Road Sweeping Project and Garbage Transportation Project in 2019. For more information, please reach the author through email address saskiapk26@gmail.com